Registered at the G.P.O., Sydney, for Transmission by Post as a Newspaper. Published Weekly.

THE

MEDICAL JOURNAL OF AUSTRALIA

(With which "The Australasian Medical Gazette," and "The Australian Medical Journal" are incorporated.)

The Journal of the Australian Branches of the British Medical Association.

VOL. II.—4TH YEAR—No. 14. SYDNEY: SATURDAY, OCTOBER 6, 1917. PRICE 6D.

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THE MEDICAL JOURNAL OF AUSTRALIA.

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PROSTATIC OBSTRUCTIONS AND THEIR SURGICAL TREATMENT, WITH SPECIAL REFERENCE TO THE TWO-STAGE OPERATION.[1]

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The material, on which the following notes are based, is derived from a study of a series of 55 consecutive cases of chronic prostatic obstruction, of which careful records have been kept. Of the 55 cases, all but six (*i.e.*, 49) came to operation. In these six cases no operation was advised, in three on account of inadequacy of the renal function, in one on account of advanced diabetes, and in two on account of evident malignant disease of the prostate. Of the last two patients one had had a permanent suprapubic cystotomy performed before coming under observation; the other was leading a more or less comfortable catheter existence. This represents an operability rate for all cases of practically 90%.

Of the remaining 49 patients who came to operation, 47 recovered and left hospital in good condition, and two died—a total operative mortality of slightly over 4%.

The operative procedures employed fall into four classes:—

(1) Suprapubic transvesical removal of a median prostatic bar; three cases; no deaths; average age of patients 49 years.

(2) Transurethral (*i.e.*, urethroscopic) high frequency cauterization of a median prostatic bar, the obstruction being completely burnt out; two cases; no deaths; average age 51 years.

(3) Suprapubic prostatectomy in one stage, mostly with combined local and general anæsthesia according to the technique of Crile; 18 cases; one death, a mortality of 5.5%; average age of patients 67 years, oldest 84, youngest 61.

(4) Suprapubic prostatectomy in two stages, a preliminary cystotomy with local anæsthesia being followed by prostatectomy under general anæsthesia at a later period. In this group, which includes most of the later operations, there were 26 cases, with one death, an operative mortality of 3.8%. The average age of the patients was 68 years. The oldest was 86 and the youngest 59 years.

In the cases falling into classes (1) and (2) operation was performed for obstruction at the vesical neck due to median bar formation.

[1] Read at a Meeting of the New South Wales Branch of the British Medical Association on August 31, 1917.

In classes (3) and (4) general adenomatous hypertrophy was the determining factor in the prostatic obstruction.

While the symptomatology in all classes is of a similar type, the pathology and surgical indications are sufficiently diversified to merit separate and detailed consideration.

Median Bar Formation.

Included under this caption are all cases of obstruction at the vesical neck, exclusive of the lateral prostatic lobes and true middle lobe formation. It is a condition that has long been recognized, but rather as a surgical curiosity than as a frequent and important cause of prostatism.

Much valuable work has recently been done in this connexion. Suffice it here to state that modern researches have established three well-defined types of bar, *viz.*, the glandular, the fibrous and the muscular. They form approximately 10% of all cases of prostatic obstruction. They are examples of what was formerly termed the "small fibrous prostate," the *prostatisme sans prostate* of the French urologist. Accumulated experience has shown that these cases do not require prostatectomy for their cure. The obstruction is small in extent, and is definitely localized. It lends itself to removal *viâ* the urethra by high-frequency cauterization, but in most cases more satisfactorily by suprapubic excision of the obstructing bar. Young, of Baltimore, has for a number of years been using a urethroscopic bar excisor in selected cases. Formerly the frequency and seriousness of ensuing hæmorrhage were such as to ban this instrument in most urologic clinics. Recently, however, he has adopted an ingenious method for the control of hæmorrhage in these cases, and it is possible that his "punch" operation may again find favour amongst those most skilled in this type of work. It, however, requires a nicety of diagnosis not easily attained.

There is a condition somewhat analagous to the above, of which I have found no previous mention, *viz.*, œdema of the vesical neck, associated with a congenitally narrow external urinary meatus. The symptoms are identical with those of prostatic obstruction, a large amount of residual urine being sometimes found. Meatotomy generally suffices for complete relief. When this condition is present in association with a definite prostatic hypertrophy, it will be the part of wisdom, after performing a meatotomy, to stay one's hand for a month or more, in the absence of urgent symptoms, before proceeding to the removal of the prostate, as the symptoms will often subside completely and the residual urine, if present, disappear. It must be remembered that not every enlarged prostate is a cause of urinary obstruction.

Prostatic Hypertrophy.

The pathological factor underlying all of the 44 cases now under review was of the well-known fibro-adenomatous nature. It has been estimated that in any consecutive series of such prostates from 10% to 15% will show evidence of malignant degeneration on careful microscopic examination. These cases, however, seldom show any signs of recurrence after operation, the malignant degeneration in such cases commonly first appearing in the centre of an adenomatous nodule, so being entirely removed.

The frankly carcinomatous cases are commonly recognizable by the stony hard feel of the gland on rectal palpation, the growth beginning in the posterior lobe between the ejaculatory ducts and the fascia of Denonvilliers. Such cases are, as a rule, beyond hope of cure by surgical intervention. When, however, there is an associated adenomatous hypertrophy, enucleation of this portion will sometimes give complete, if temporary, relief to the urinary obstruction. As a rule, these cases should not be subjected to any operation, however radical. Suprapubic cystotomy should be a last resort and delayed as long as a catheter can be passed.

Whether radium and mesothorium are to play an important part in the treatment of this disease, the future alone can tell.

So far as operative procedures in prostatic hypertrophy are concerned, detailed consideration will be given only to the two-stage operation of suprapubic prostatectomy. The perineal operations, whether by the dissecting methods of Young and Proust, or by the median blind enucleation, have, except by a few notable enthusiasts, been very largely abandoned. The chief claim to consideration for the perineal methods, that of a lessened operative mortality, is no longer valid. In skilled hands, the high operation now yields an operative mortality of not more than 3% to 5%, or even less, and almost complete immunity from such annoying sequelæ as stricture of the urethra, incontinence of urine and fistula formation.

Cystoscopic Examination.—So far as cystoscopic examination is concerned, this, as a rule, is employed only when there are symptoms of prostatism and no prostatic enlargement is palpable on rectal examination, or when hæmaturia suggests the presence of some associated bladder growth. The value of this procedure will be apparent, when it is stated that in two recent cases papilloma of the bladder was found to be present, in one case being responsible for the entire symptom complex, in the other occurring as an associated lesion.

Four other patients presented themselves for treatment during this period as supposed prostatics, and rectal and cysto-urethroscopic examination found an entire absence of prostatic obstruction. All presented, at a later date, definite evidence of chronic nervous disease, previously unsuspected, two being tabetics.

Pre-operative Treatment.

This necessarily depends upon accuracy of diagnosis, both of the local condition of the bladder and prostate, and of the general condition of the patient —more particularly as regards the renal function.

The same routine is followed in all cases so far as possible.

When there is residual urine exceeding 120 c.cm. in amount, preliminary constant drainage of the bladder by an in-dwelling catheter is adopted, the organ being first gradually emptied of its contents.

In cases with a less amount of residual urine than 120 c.cm. this step may be dispensed with, if conditions are otherwise favourable.

When a permanent catheter is employed, it is kept in place. when tolerated, from one to several days, depending on the amount of residual urine and the local and general reaction of the patient. As a general rule it may be stated that the larger the amount of residual urine and the lower its specific gravity, the more severe is likely to be the reaction following the institution of catheter drainage and the longer therefore should its employment be maintained. The time has varied from 36 hours to five days in the cases in this series in which it was employed.

Some patients are admitted with acute retention, in whom no form of catheterization will be tolerated, or in whom, perhaps, no catheter can be passed. In these cases operation has often to be proceeded with forthwith.

Some patients will permit intermittent catheterization only. In such cases the bladder should be completely emptied at least once daily for several days.

Combined with catheterization, and almost of equal importance, is the forced ingestion of fluid.

Urinary antiseptics, both internally and as bladder washes, have an important, though subsidiary, place.

General therapeutic indications have to be met in most cases. Every case should receive the benefit of a careful systemic examination. The importance of this cannot be overestimated.

When the steps above outlined have been faithfully carried out, it is astonishing in how few cases will operation have to be refused on account of deficient renal function or general organic disease, and the patient will have been placed in the best possible condition to withstand the next step: that of suprapubic cystotomy, *i.e.*, the first part of the two-stage operation of suprapubic prostatectomy .

There are some few authorities who maintain that the retained catheter will accomplish all that a cystotomy can. While this is probably true in most cases of median bar formation, it certainly does not apply in many cases of prostatic hypertrophy. For the catheter itself, when long retained, often sets up a local irritative process of the urethra and prostate.

As a matter of practical experience, one very frequently finds a remarkable shrinkage of the prostate after cystotomy, as manifested by diminution in size of the intravesical projection and decrease in depth of the post-prostatic recess, evidently due to subsidence of inflammatory œdema. This cannot do other than act beneficially, by tending both to decrease the amount of post-operative hæmorrhage and to facilitate the enucleation of the prostate, both of these

being important factors in the elimination of post-operative shock.

Technique of Two-stage Suprapubic Prostatectomy.

First Stage: Suprapubic Cystotomy.

This is always begun, and very generally completed, entirely under local anæsthesia. In most cases 0.01 gm. (gr. 1/6) of morphine and 0.0005 gm. (gr. 1/120) of atropine are given hypodermically three-quarters of an hour before the operation in order to allay nervousness.

In some of the cases (especially the earlier ones), a few whiffs of chloroform or ether were used to supplement the local anæsthesia, generally preparatory to incising the bladder or because the peritoneum had been opened. With practice, however, and a docile patient—and the greater number of these patients will found docile if sufficient trouble is taken beforehand to gain their confidence—it has been found possible to do the majority of these first-stage operations without any general anæsthesia whatsoever.

Novocaine (¼% to ½%), and latterly *néocaine* and *surrénine* (½%), have been the local anæsthetics employed. About 75 c.cm. of the solution will generally be required, and may be employed without risk of untoward effects.

Where a catheter can be passed, the bladder is carefully washed and completely emptied, and a rubber air bulb attached to the end of the catheter.

Local infiltration of the skin in the line of the incision is then commenced. This extends from 8 to 10 cm. upwards from the top of the symphysis. A hypodermic needle attached to a 10 c.cm. "Record" syringe is used for the skin infiltration. The rest of the parietes are then carefully injected, using a 7.5 cm. needle, especial care being taken to push the needle well down behind the symphysis. The incision can then be carried down through the aponeurosis and the *recti* muscles separated, with an occasional further injection of the anæsthetic solution, if required, though this will rarely be the case when sufficient care has been taken over the preliminary injections. At this stage it is advisable further to infiltrate the prevesical and adjacent sub-peritoneal tissues, in case they have been missed by the preliminary injections. The gauze-covered finger is pushed well down behind the symphysis and the peritoneal reflection wiped upwards off the bladder. A few bulbfuls of air are then injected into the bladder through the catheter in the urethra, and the bladder wall picked up with two tissue forceps as it rises. The peritoneal reflection is then carefully pushed further back from the bladder till the highest available part is reached.

When it has been necessary to operate in the presence of an acutely distended bladder, this is carefully emptied by a trocar and cannula after infiltration and separation of the peritoneal reflection.

After careful walling off, the bladder is opened at the highest possible point, and the incision carried downward till a finger is readily admitted. With the index finger of the left hand in the bladder, it will generally be found possible to peel the peritoneum up still further. This separation should be carried on until the summit of the bladder is reached and the incision in the bladder carried up to this point. The incision should be of sufficient length to admit two fingers easily. When this incision is closed with fine catgut the resulting scar will readily stretch during the subsequent prostatectomy, and allow easy delivery of the prostate without risk of tearing the adjacent bladder-wall.

Careful finger (and if necessary, visual) exploration of the bladder is then carried out, and stones, if present, removed. This is readily done without any anæsthesia of the interior of the bladder, provided no undue roughness be employed. A large glass drainage tube (2 cm. in diameter, with two lateral openings) is then placed in the upper angle of the bladder incision, and the bladder wall closed below it with interrupted sutures of fine catgut, including all the coats except the mucosa. Four of these will generally suffice, unless the preliminary opening has been made too low. The tube is allowed to project at a natural angle from the bladder and passes out slightly below the centre of the abdominal incision. The muscles and aponeurosis are carefully united with interrupted mattress sutures of No. 4 plain catgut above and below the tube, the lowest suture picking up the fibrous layer of the bladder wall at, or below, the lower angle of the incision in the bladder. The sutures are so placed that the tube lies quite loosely between the upper and lower parts of the abdominal incision. A few sutures are placed in the fat, and the skin is closed with Michel clips, and painted with tincture of iodine. There are no penetrating skin sutures. The drainage tube is fixed in position by a split strip of zinc oxide strapping placed outside the dressings. The urethral catheter is removed and the patient returned to bed.

With careful technique the wound of these first-stage operations should heal round the tube by first intention in practically every case.

When glass tubing is used for drainage, Michel clips are used for the skin, to be removed on the fourth day, and as there are no penetrating skin sutures, there should be no sign of sloughing or pus-formation. The second stage may then be undertaken without fear of infection of the deeper tissues from the abdominal wound. This statement by no means holds good when rubber tubing is employed for drainage, its use being almost invariably associated with a greater or less degree of sloughing along the drainage track. Stitches penetrating the skin are also liable to cause stitch suppuration, mostly superficial, it is true, but none the less to be avoided.

The time allowed to elapse between the first and second stages of the operation will generally be about 10 or 12 days, 14 days being the longest interval in the present series of cases. It is my firm conviction, based on reasons given below, that seven days should be placed as an irreducible minimum interval, even in cases appearing most favourable. The only patient in this series who died, was operated on earlier than this, *viz.*, on the third day.

The preparation for the second stage begins immediately after the return to bed from the first

operation. The glass tube is immediately coupled up with a bottle tied to the side of the bed, and continuous drainage instituted except in those cases where operation has had to be undertaken in the presence of an acutely distended bladder. In these cases the tube is clamped, after the bladder has been filled with sterile water, and the bladder is gradually emptied in the course of 24 or 36 hours, when continuous drainage is permitted.

On return to bed there is a complete absence of shock and remarkably little discomfort or disturbance of the general equilibrium. The patient is given a cup of tea or other stimulant, and very often the morning newspaper. This, of course, only holds with patients in good general condition prior to operation. Patients previously excited and restless, and more or less uræmic, naturally take some little time to regain their lost *aplomb*. The peculiar train of mental symptoms sometimes seen after a one-stage prostatectomy have been noticeably absent in these two-stage cases. Whatever post-operative disturbance is going to take place will rarely be in evidence before 36 hours, and sometimes not before the fourth or fifth day. Various uræmic manifestations may then make their appearance. These are generally of minor degree in cases adequately prepared, though occasionally of unexpected severity even in the best cases.

Stage of Depression.—This has been aptly styled the stage of depression following renal decompression. The urinary signs most commonly found are albuminuria, often of a high grade, decrease in amount of urine with increase of its specific gravity, or sometimes a marked polyuria with a lowered specific gravity. A minor degree of hæmaturia is not uncommon. There will also be a marked associated drop in the indigo-carmine and phthalein tests, and a rise in the blood-urea. These manifestations commonly subside in from three to five days, the urinary signs and general symptoms, when present, improving, as a rule, *pari passu*. It is often surprising how little general disturbance is present even with the most marked changes in the urinary output.

Not until a condition of stable equilibrium has been established should the second stage be proceeded with. Only rarely will this require more than 10 to 12 days. The improvement may generally be gauged with sufficient accuracy by ordinary clinical methods. It is safer, however, when possible, to employ the various special tests at our command.

There should be little or no urinary leakage around the tube, and after the first 24 hours the patient should be completely dry. The wound is freely mopped over with *spiritus vini methylatus* once or twice daily.

The same general treatment is applied as in the case of the preliminary catheterization, except that no urethral instrumentation is now employed. Fluids are forced, and other local and general remedies used according to indications. Only rarely will irrigation of the bladder be required. Where necessary, either constant or occasional irrigation may be practised, without in any way disturbing the patient, by means of the simple contrivance illustrated (see figure).

Apparatus for Constant or Intermittent Irrigation of the Bladder.

(a) Rubber catheter perforating rubber drainage tube (b) attached to ordinary glass drainage apparatus. The end of the catheter projects 5 to 7.5 cm. (2 to 3 inches) beyond the end of the glass tube into the bladder. The irrigating fluid runs in through the rubber catheter and out through the glass tube.

Every effort is made to keep the urine strongly acid, *sodii phosphas acidus* and *ammonii benzoas* being freely exhibited, if necessary, for this purpose.

Second Stage: Suprapubic Prostatectomy.

This is undertaken with full anæsthesia, ether by the "open" method, and, occasionally, chloroform being the anæsthetics administered in the cases here recorded.

Before the patient is brought into the theatre the bladder is carefully washed out and emptied through the suprapubic tube, which is then removed. Some sterile gauze is lightly stuffed into the fistula. The operation area is then painted with tincture of iodine. This is repeated on the operating table, the iodine then being freely swabbed into the fistula.

For convenience and to save repeated washing, three gloves are worn on the left hand (one or two fingers of which are used to push up the prostate *per rectum*. The wrist-ends of the gloves are rolled over in such a way that each can be removed by an assistant without soiling the one underneath. The right hand, which carries out the enucleation, is gloved as usual. With proper arrangement of sterile towels and sheets thorough operative asepsis is thus readily maintained, despite the rectal manipulations.

When all is in readiness, the anæsthesia is begun. A heavy iodized silk suture, including the aponeurosis, is passed deeply through the wound immediately above the fistula, and tied through narrow-gauge rubber tubing. This is a permanent suture, and serves to prevent the wound opening up during the manipulations incident on removal of the prostate.

No further incision is necessary where the second stage follows within two or three weeks of the first, otherwise superficial downward and lateral incisions may be required to avoid risk of tearing the peritoneum in the upper angle of the wound.

When the patient is fully anæsthetized, one or two fingers of the left hand are gently passed into the rectum, and the first finger (and later, if necessary, two fingers) of the right hand through the suprapubic fistula into the bladder. The *cul-de-sac* behind the prostate is carefully explored bimanually for stones, which may have been missed at the first operation. The *cul-de-sac* and the prostatic projection will often be found to have decreased materially in size during the interval that has elapsed since the first operation.

The finger tip is now pushed into the prostatic urethra. The mucous lining is broken through in front and the plane of cleavage sought. As a rule this is readily found, and the upper portion of the prostate separated from its capsule from before backwards, first on one side and then on the other. Great care is taken to separate the sphincter completely from the mass, preferably as a first step in the enucleation.

The operator must be guided by circumstances as to the next step. In the majority of cases it will be found easier to sweep the finger circumferentially round the mass, and to complete the enucleation from above downwards, particularly in that type of growth with large intravesical projection. In other cases the enucleation may be accomplished more readily from below upwards, separating the two sides and apex of the gland first and then rolling the entire mass up into the bladder, the posterior surface being separated last of all. In any case, the internal sphincter, having been separated at an early stage of the operation, is completely preserved.

In most cases the entire mass is removed in one piece, being intact except in front, where the anterior commissure has been broken through in the first step of the operation.

Sometimes small nodules of growth do not come away with the main mass. These must be sought for and completely removed. It is of the greatest importance that the finger in the rectum and that in the bladder should detect bimanually that the prostatic bed is completely freed of all palpable nodules. This step is sometimes most difficult of accomplishment. Its neglect is apt to lead to serious post-operative hæmorrhage, sloughing in the prostatic bed, delayed closure of the suprapubic fistula and later to recurrence of the obstruction. Marked difficulty in the posterior part of the separation is always suggestive of malignancy.

Following the complete clearing of the prostatic bed the anæsthetic is discontinued. A pad of gauze is then pushed down on the prostatic bed, and firm bimanual compression maintained for a few seconds The pad is then removed, a final sweep of the bladder made with the index finger, the mucous membrane and internal sphincter pushed well down into the prostatic bed, and any débris removed.

No irrigation of any kind is used.

A large glass drainage tube, as used in the first operation, is placed comfortably within the bladder and a single, through-and-through suture of iodized silk passed deeply through the abdominal parietes below the tube, and tied through narrow gauge rubber tubing.

No sutures are required in the bladder wall. Occasionally an additional suture is used below the fistula to approximate the sheath of the *recti* muscles, where these may have been separated during the strenuous efforts sometimes necessary for the prostatic enucleation.

It is unnecessary and unwise to close the abdominal opening tightly around the tube, as there is often a considerable amount of oozing from along the drainage track during the first 24 hours. No fixation suture need be placed round the drainage tube, which is retained in position by a strip of zinc oxide plaster placed outside the dressing, as after the first operation.

Post-Operative Management.

In practically all cases the patient is returned to bed with a pulse-rate considerably below 90, the absence of shock being a notable feature.

The glass tube is connected up with a bottle at the bedside, and permanent drainage instituted. All patients, as a matter of routine, have the scrotum suspended on a wide strip of zinc oxide plaster slung across the upper part of the thighs. This, besides being a great comfort to the patient, has practically banished epididymitis, which was formerly a fairly frequent and troublesome complication of the convalescence.

On recovery from anæsthesia an injection of 0.01 gm. of morphine and 0.0005 gm. of atropine is generally administered, though there is generally remarkably little complaint of pain if the tube is well placed. The large size of the glass tube ensures ample drainage, and all of the mixed urine and blood commonly passes through this even during the first 24 hours. After this the wound contracts down on the tube, and the patient is completely dry until its removal on the third or fourth day. From this time until natural micturition is established, the patient is kept comfortably dry by means of a firm, broad abdominal binder. While this is in position there is no more leakage of urine than can be comfortably taken care of by a sterile pad and folded hand-towel changed every three or four hours, provided that at each change of dressing the patient is instructed to strain gently as though to pass his urine. Thus, or often without this effort, there is a gush of retained urine through the fistula at each change of dressings, so that in the interval provision has only to be made for the overflow.

There is a minimum of discomfort from moisture or urinous odour in a properly conducted case, and certainly none of that misery and disgust which were so prominently associated with the old type of suprapubic operation.

From seven to nine days after operation, the majority of patients, with a little judicious coaxing, will begin to pass urine naturally, some few even earlier than this.

When healing has occurred by first intention round the fistulous track, all of the urine should be passing naturally two or three days later.

In other words, where primary union round the fistula has occurred, all urinary leakage may be expected to cease not later than nine to twelve days after operation.

The longest period of leakage after operation in any case in this series was 17 days, this being the only case that exceeded 14 days. In one case there was no leakage after the sixth day.

These patients, when practicable, are all nursed out of doors, the bed being wheeled on to the balcony 24 hours after operation.

The early rising practised by some authorities is not encouraged, though the patients are place in Fowler's position as soon as they have recovered from the anæsthesia. They leave their bed as a rule about the tenth day.

No catheter is tied into the bladder, and only in exceptional instances, such for example as in persistent cystitis due to the presence of diverticula in the bladder, is any further instrumentation necessary.

So far as post-operative complications are concerned, since adopting the two-stage operation all serious pulmonary, cardiac and uræmic manifestations have been noticeably absent (with the exception of the one patient mentioned above, who was operated on three days after the preliminary cystotomy and promptly died).

This freedom from complications and wonderful smoothness of the convalescence constitute the great advantages of the two-stage operation.

Summary.

The advantages of the two-stage operation described may be briefly summarized as follows:—

(1) Renal decompression with the least risk, half of the operation being completed without general anæsthesia, surgical shock or hæmorrhage. The patient is thus placed in the most favourable possible condition to withstand any renal complications which may follow the cystotomy.

(2) Primary union of the cystotomy wound around the drainage tube, thus eliminating the prevesical space from risk of infection during the subsequent prostatectomy.

(3) Full recovery from the stage of depression following cystotomy before proceeding to removal of the prostate, thus almost entirely eliminating uræmia and urosepsis as a complication of the second stage.

(4) Immediate enucleation of the prostate following induction of anæsthesia, thus decreasing the amount of anæsthetic required and minimizing the likelihood of post-operative pulmonary sequlæ.

(5) Diminution of post-operative hæmorrhage and shock, the pulse rate rarely rising above 90 at the termination of the operation.

(6) Diminution of the amount and shortening of the period of post-operative urinary leakage and discomfort, all of the urine usually passing naturally within twelve days of the operation without any further instrumentation of the urethra.

The technique described is applicable to all operable cases of benign hypertrophy of the prostate. By its use, bad risks will very frequently be converted into good and good into better. The operability rate will rise, the mortality decline, and the post-operative morbidity and discomfort be reduced to a minimum.

THE ESTABLISHMENT AND WORK OF THE COMMONWEALTH SERUM LABORATORIES.[1]

By **W. J. Penfold, M.B., C.M., Ed., M.R.C.S., L.R.C.P., B.Hy., D.P.H.,**

Director, Commonwealth Serum Laboratories.

The work which it is proposed we should undertake in these laboratories is the preparation of sera and vaccines and the carrying out of such bacteriological examinations of material as may be required in the work of the Quarantine Department. No provision for research is made under the scheme.

The most recent requirements in laboratory construction have been attended to in the design of the laboratories. We have arranged (1) for a supply of sterile air to the room where the bottling of the serum is carried out, (2) for a small room within the vaccine room for the inoculation and collection of vaccines and for conducting difficult operations which require special attention to sterility, such, for example, as the production of Noguchi's vaccines. (3) The laboratories are arranged in such a way as to secure easy working and easy supervision. (4) A small, special, detached laboratory is provided for, in which work of a dangerous character, such as the making of plague vaccine, may be undertaken without undue risk to workers not actually engaged in the operation. Tetanus toxin will be made in a special room reserved for the purpose, so that no possible contamination of serums or vaccines may result from its manufacture. Our accommodation for the horses and small animals will not differ much from that of other institutes, and on that account it will not be necessary for me to go into that side of the subject.

In a recent paper an author, dealing with the special subject of serums, confused the terms serum and vaccines. Let me, therefore, say clearly that, in speaking of serums throughout this paper, I mean exclusively serum taken from the horse or some other animal for producing passive immunity in the patient. The term vaccine is used to indicate the material we inject into man to produce in him a state of active immunity. In this case he produces his own antibodies, and does not receive them from without, as he does on receiving a dose of immune horse serum. The vaccine is usually either a dead or living culture of the organism against which we propose to protect the patient.

[1] Read at a Meeting of the Victorian Branch of the British Medical Association on September 5, 1917, and at a Meeting of the New South Wales Branch of the British Medical Association on September 28, 1917.

Serums.

The principal serums that we propose to make are those against diphtheria, tetanus, dysentery, cerebro-spinal meningitis, streptococcal infections, and perhaps pneumococcal infections. Before looking at these serums individually, I would like to consider with you the qualities of a good serum, and how we will endeavour to obtain these qualities in the serums we issue. The first quality of a good serum is sterility. This seems commonplace, but in practice it is extremely difficult to obtain absolute assurance of the sterility of a serum. To obtain sterility various methods are employed in different parts of the world. The Pasteur Institute, for example, relies upon very careful collection of the serum and intermittent heating after bottling, to produce a sterile serum. This plan, as carried out in the Pasteur Institute, is exceedingly good, and the product they issue is uniformly sterile and of a clear, good appearance. It suffers, however, from this defect—that, during the heating process, about 25% to 30% of the anti-toxic value of the serum is lost, so that the financial loss accruing from the process is very considerable.

The next method of sterilizing serum, and by far the most general, is to collect the serum carefully, then to filter it through a Berkefeld or some similar filter, and then to add tricresol to the extent of about 0.4%. The difficulty about this method is that the great bulk of the ordinary filters are not bacteria-proof as they are ordinarily used; for example, a Berkefeld filter, after it has been autoclaved, is liable to permit the passage of organisms, and since autoclaving is the usual method of sterilizing this filter, one can not have absolute confidence in the results of such filtrations. If odd organisms get through, one cannot depend absolutely upon the 0.4% tricresol arresting their growth, as strains of bacteria are known which grow in a 0.5% tricresol solution. While this method, therefore, is by far the most general method of treating serum, and is usually successful, still it leaves much to be desired.

The third method that I would like to mention is the filtration of the serum through the Pasteur-Chamberland filter. This Pasteur-Chamberland filter is used in two varieties, one of which is, in actual fact, efficient. The reason that the use of this filter is not general is that the filtration of serum through it is so slow that where serum is to be turned out in large quantities, it is difficult to overtake the output. MacConkey, however, has got over this difficulty by the use of his water bath, and the whole of the serum issued by the Lister Institute is put through this filter; tricresol is added. This last system is not attended with any considerable loss of antitoxin, and is in this respect preferable to the French method. It is absolutely safe in respect of bacterial contamination, and is, therefore, much superior to the ordinary methods employed, and we propose in our laboratories that all our serum shall be treated by filtration through the best Pasteur-Chamberland candles.

Last summer I made inquiries about antitoxin that had been supplied to the French and British for army purposes, and I was informed that some of it in each country had been found to be contaminated.

This danger of contamination is, therefore, real, and requires the strictest attention. It is all-important also in attaining sterility to prevent any bacteria which can be avoided from entering the serum at any part of the process of production. In this regard one part of the process requires special consideration. It is a very common thing, when collecting the serum from the clotted plasma, to press the clot in a small press. In this stage the serum is specially liable to become contaminated, and any method which will enable this stage to be avoided is worthy of consideration. More recently a better method has been evolved; during the process of clotting, the plasma is kept on a shaking machine, with the result that the fibrin forms a small, separate mass at the top of the bottle. In this method the services of a press are not required, as the fibrin forms such a small mass as not to contain sufficient antitoxin to be worth separate attention. In respect of the bottling of serum, two general methods are in vogue. One is to enclose the ampoules in a glass vessel, to exhaust the vessel partially, and fill in the serum by means of air pressure when the air pump is disconnected. This method is very rarely used. The usual method is to fill each ampoule directly by hand, having the serum container and the ampoules all enclosed in a glass case, arranged so that there is a glass wall between the face of the person and the ampoules which she may be filling. In the latest developments the rooms which the serum fillers occupy are supplied with sterile air. No one is admitted into these rooms excepting the fillers. They are clothed in sterile overalls, and every precaution is taken to prevent infected dust being carried into the chamber where the filling operation is carried out. If these precautions in the different operations be carried out well, the product may be issued with confidence.

The next quality of the serum which we desire is high potency. The features which determine the obtaining of a serum of high potency are chiefly the following:—

First of all the toxin that one uses in the process of immunization. In immunizing against diphtheria toxin it has been found that the best results are obtained by using a toxin which has matured by keeping, so that the slight toxicity which is left does not seriously upset the horses, and the so-called toxoids are highly efficient immunizing agents.

Secondly, the method of bleeding. In many laboratories the bleeding is conducted in a regular fashion, more or less mechanically; for example, the horses are bled each week; whereas, in other laboratories, careful estimations of the titre of the serum are made regularly, and the bleeding is carried out in direct accordance with the results of these estimations. Judicious periods of rest are given to the animals, so that they may be kept through the whole of the period in the very best condition. In many laboratories abscess formation in the horses is a common feature of the work, whereas in other laboratories abscess formation is an extremely rare occurrence. This probably depends upon the fact that in some laboratories the toxin is injected into horses in several places without previous disinfection of the skin,

whereas in other laboratories the skin is carefully disinfected and the injection is made only at one place.

Thirdly, potent serum may be produced by the concentration of serum of low unitage. According to the method of Homer, of the Lister Institute, serum can be concentrated in bulk no less than nine times, so that a two-hundred unit antitoxin becomes an eighteen-hundred unit antitoxin. During this process two-thirds of the serum protein are got rid of, and that portion only of the serum protein is retained with which the antitoxin is in intimate union, the so-called pseudo-globulin. Concentration has the further value of diminishing the incidence of serum disease.

I throw on the screen a design of our serum concentration laboratory, in which this serum concentration will be carried out under the supervision of a trained protein chemist. The technique of serum concentration is at the present moment in a rather unsettled state, and frequent improvements are being suggested. It is highly important for us to keep in touch with the new work on the subject, so that our methods may be up-to-date.

The next essential quality in a good serum is that it should be capable of standardization. Diphtheria serum and tetanic serum may be accurately standardized to almost any degree of precision that we desire; but, unfortunately, in the case of many of the other serums in general use this is not so. As an example of these serums which we cannot accurately standardize, the antimeningococcal serum is perhaps the best known. Attempts have been made to standardize this by means of its agglutinin content, as tested against one organism, or by determining its power of causing agglutination of a large number of meningococcal strains, that serum being held the most potent which agglutinated in the highest dilution, or, on the other hand, which agglutinated the largest percentage of the test strains. Since the agglutinin content is not known to have any relationship to immunizing and protective value, this obviously may be a fallacious method. A method has been introduced recently of standardizing the antimeningococcal serum by means of its protective value in mice. This has been worked out by one or two members of the scientific staff of Mulford's, and while it seems a great improvement on the agglutinin method, still the results on animals are not absolutely regular, so that we have to resign ourselves to the fact that in meningitis serum we are dealing very largely with an unknown quantity. Up to the present, dysenteric serum has not, as a rule, been standardized; but since Shiga's bacillus is essentially a toxin producer and almost strictly analogous in this regard to the bacillus of diphtheria and the bacillus of tetanus, an accurate standardization of anti-Shiga dysentery serum may be reasonably expected. In regard to anti-streptococcal serum, anti-pneumococcal serum and other anti-bacterial serums, the possibility of accurately standardizing them seems remote.

One great difficulty which most serum institutes suffer from is that the clinical effects of the serums cannot be carefully watched by people who are interested in the manufacture of serum. This does not obtain in those serum institutes which have hospitals attached. Nevertheless, by careful and serious co-operation on the part of the medical profession, careful data might be collected on the clinical effects of these serums, which should be of enormous value; this applies essentially to those serums which we cannot accurately standardize in the laboratory and the use of which can only be justified on the ground of clinical experience.

Vaccines.

Autogenous vaccines will not be made in the Commonwealth Serum Laboratories. On the other hand, stock vaccines for prophylaxis and treatment will be issued. In the making of these vaccines several interesting problems arise for consideration, problems which are of great interest to the general practitioner who may be engaged in making autogenous vaccines for his own patients. The first of these is, How shall we sterilize the vaccine? In the old days it was customary to sterilize vaccines by heat, and in order that there might be no mistake on the score of sterilization rather drastic degrees of heat were applied. It was shown by Leishman and other workers that vaccines were very easily injured by heat in respect of their antigenic power, with the result that at the present time when heat is applied as a means of killing, the very lowest degree of heat possible is used. In the Army Medical College, Millbank, where the vaccine is made for the British Army, the vaccine is heated to 53° C. (= 127.4° F.), but the period of heating is not sufficient to sterilize the vaccine completely, and the sterilization is completed by means of the added antiseptic. In many institutes the sterilization is completely effected by the heating, but in these cases antiseptic is usually added in addition, and, since the amount of added antiseptic is, as a rule, easily sufficient to kill the vaccine the value of heating appears to be extremely doubtful. In some cases the vaccine is issued after having been killed by heat, and no antiseptic is added; naturally, in these cases, the heating must be sufficient of itself. We propose in our institute to adopt the method of killing by antiseptics usually. We propose to allow a margin of from 30% to 100% more antiseptic than the minimum required to kill the vaccine. For example, if paratyphoid B vaccine to which tricresol has been added be kept at 37° C. for three hours, it is found that 0.2% will effectively sterilize it. At room temperature this does not occur, but by increasing the concentration to 0.3% sterilization is effected in six hours, and since we are using 0.4% tricresol we have a liberal margin. It has been shown by several workers that some sterilized vaccines are not effective if they have been exposed to even moderate degrees of heat. In this regard I would instance the work of M. d'Herelle, who showed that a vaccine killed by a moderate degree of heat was useless in protecting animals against a disease to which they were naturally liable, whereas a similar vaccine killed by an antiseptic gave a very high degree of immunity. We, therefore, feel justified, under these circumstances, since we are going to add an antiseptic in any case and since the concentration of that antiseptic is sufficient to kill, in omitting entirely the sterilization by heat.

The next question that I would like to look at with you in vaccine making is the technique of counting

the vaccine. Until recently the general method has been to count by Wright's method or by some opacity standard. Wright's method is inferior in many respects to the dark ground method of counting, and takes much more time; consequently, we will adopt the dark ground method here. A sample of a vaccine under the dark ground is shown, so that an estimation of its value may be readily formed by every one of you. Opacity tests are very useful for ordinary vaccines of known organisms, where small differences in dosage would have but little effect; but where one is dealing with highly toxic organisms, like Shiga's dysentery bacillus, it is very important that the counting should be accurate, and there is no doubt that the dark ground method gives the most accurate results. As to the actual technique of making vaccines in large quantities I realize that that is a subject which is of minor interest to a general medical society, but it is a matter of immense importance where we desire to have a product which is reliable and not contaminated. The method that we propose to adopt is a combination of different portions of the technique employed in the Pasteur Institute, the Laboratory of the Royal Army Medical Corps and other laboratories, and is sufficiently illustrated by the lantern slides. The vaccines that we hope to make will include typhoid, paratyphoid A and B, cholera, staphylococcus, meningococcus, gonococcus, pneumococcus, streptococcus, acne, plague, tuberculin and mallein. Before leaving this question of vaccines, we might touch for a moment on their value and on their methods of standardization. They are usually standardized by simple counting, but that is known in many cases to have no relationship to their immunizing value. It is found, for example, that a plague vaccine grown on agar will not immunize rats against the same strain of plague grown on serum media, so that it is quite obvious that no method of counting which ignores the variability of the organism can provide an entirely satisfactory standard. One of the most interesting problems in the immediate future is to determine the immunizing value of any vaccine against the particular type of organism which is found actually in the body of the patient, and especially at that stage of the infection where death is most liable to occur. It is unfortunate that we have such a small amount of accurate knowledge as to the value of vaccines in treatment. Vaccines, as prophylactic agents, have a very well-defined field of usefulness, and of their value in the case of typhoid, cholera and plague there cannot be any doubt. But when we come to consider the evidence of the value of vaccines in treatment the case is very difficult. In order to demonstrate their value clearly, one requires to have a long series of cases in which alternate patients have been treated by vaccine and alternate patients without vaccine. Unfortunately, evidence of this sort is not available in the great bulk of cases, and still more unfortunately the clinician is unwilling or unable to lend himself to the obtaining of such evidence. He reasons: "The vaccine may do good; I have no right to withhold it in the alternate case." The same reason applies also to many antibacterial sera, with the result that that rigid proof which should be the basis of all treatment is, in the case of the use of many of our vaccines, almost entirely wanting. In this regard I would like to mention a personal experience of my own in the King George Military Hospital. A large number of wounded showed a high temperature for long periods. After some disappointing experience with autogenous vaccines, in as far as they were ineffective in reducing temperature, Dr. Ledingham and I determined to use a stock vaccine made from about eighteen strains of different organisms isolated from wounds in that Hospital. In the first instance we got apparently very marked effects, so that within one or two days of the administration of the first dose of vaccine the high temperatures fell to normal and continued normal. This occurred so frequently as to make it appear worth while to get statistics from which we might hope to obtain rigid proof of the value of such vaccines. I commenced to collect the evidence by treating alternate cases with the vaccine and alternate cases without, and although, when I left the King George Hospital the series was still quite small, on going over it carefully I was unable to convince myself that the improvements which had been evidenced in the first series, were anything more than chance results. It seems to me that what we want to do in this matter of exhibition of vaccines in treatment is to subject it to the most rigid tests. As the prophylactic use of vaccines has been submitted by Wright, Leishman, Haffkine and many others to rigid statistical tests, we may hope that in the course of the next few years we may be able definitely to ascertain whether these vaccines in treatment give the effects which chance observations have caused practitioners to attribute to them. This would be a research involving an enormous amount of work on the part of the clinical observers and on the part of the individuals who were co-ordinating their observations, but it seems to me to be necessary to us as a profession, and well worthy of some self-sacrifice on our part. Taking, as a further example, the question of the treatment of pyorrhœa by vaccines. Individuals have come forward and seriously claimed the regular cure of the condition of pyorrhœa by means of streptococcal vaccines. On the other hand, a large number of individuals have used these vaccines after reading the results which have been claimed by the first mentioned observers, and after considerable experience have found no definite evidence of their value. Unfortunately, the vaccine question has a commercial side, and that does not help towards the elucidation of the problem as a matter of pure science.

I would be intensely interested to hear of the organization of the vaccine therapeutic work of the Australian medical profession being put on such a basis that after five or ten years we might really know the value of these vaccines used in treatment.

Noguchi's Vaccine.—Noguchi has recently introduced a new vaccine against small-pox. This vaccine is made in the testicle of the rabbit, and differs from the ordinary lymph in so far as it contains no extraneous bacterial contamination. In view of the fact that vaccine lymph has been credited (usually erroneously) with causing various infections, a lymph sterile in respect of all other organisms except the virus of vaccinia, is highly desirable. Up to the pre-

sent this vaccine does not appear to have been put on the market; it is difficult to make, and its potency varies in a disconcerting manner. These difficulties will doubtless be overcome, and a valuable addition to our vaccine equipment accrue.

It is proposed to issue also from the laboratories material for carrying out the Schick test. It has been shown by Schick that many individuals carry a considerable quantity of diphtheria antitoxin in the blood, and this test appears to give a very correct idea of the immunity of the individual to diphtheria. I have seen some of the results of the use of this test, and it seems to have come to take a permanent place in determining those individuals to whom diphtheria antitoxin should be given as a prophylactic. Tuberculin will also be made by us; in the first instance old tuberculin will be the only one which we will issue. It is rather extraordinary, in view of the fact that over 100 tuberculins have been described, that the Pasteur Institute in Paris issues only one tuberculin, and that is the old tuberculin of Koch. They believe that there is no scientific evidence to warrant the manufacture of more varieties, and we propose to be guided in the meantime by this opinion. We hope also to supply luetin, which is a polyvalent extract of *Treponema pallida*, and which appears to be of such great value in diagnosing late and latent syphilis.

Our laboratories being in the Quarantine Department, we shall have from time to time submitted to us material for bacteriological examination in connexion with the activities of that Department. The exact extent of work that this will imply has yet to be determined.

We hope to put such products at the disposal of the medical man in Australia as will deserve his confidence and will secure his co-operation in helping us to determine in a strictly scientific spirit the value of any biological product of which the value is at the present moment still uncertain.

I cannot finish this short account dealing with the establishment and work of the Commonwealth Serum Laboratories without acknowledging our indebtedness to Dr. C. J. Martin, Dr. MacConkey, and Dr. J. C. G. Ledingham, of the Lister Institute, London, Dr. Roux, Director of the Pasteur institute, and his colleagues, Drs. Martin and Salembini, likewise to several colleagues in America, notably Dr. Park and Miss Wilcox, of the New York Public Health Laboratory, Dr. White, Director of the Serum Laboratory at Otisville, Drs. Hitchens and Hoffman, of Mulford's Serum Laboratories, all of whom gave the most generous assistance in the way of demonstrating and discussing the different methods that they respectively employed.

AUSTRALIAN ARMY MEDICAL CORPS COMFORTS FUND.

Since we went to press last week, two contributions have been received in response to our appeal for assistance for the Australian Army Medical Corps Comforts Fund. The total is gradually increasing, but we are still a long way off the goal we have in view.

	£	s.	d.
Amount previously acknowledged	65	8	0
Dr. F. G. Meade (Laidley, Q.)	2	2	0
Dr. J. A. Cameron (Ipswich, Q.)	2	2	0

Public Health.

NEW SOUTH WALES.

The following notifications have been received by the Department of Public Health, New South Wales, during the week ending September 15, 1917:—

	Metropolitan Combined District. Cs.	Dths.	Hunter River Combined District. Cs.	Dths.	Rest of State. Cs.	Dths.	Total. Cs.	Dths.
Enteric Fever	2	2	1	0	4	0	7	2
Scarlatina	16	0	0	0	11	0	27	0
Diphtheria	33	1	8	0	34	0	75	1
C'r'bro-spinal Meningitis	1	0	0	0	1	0	2	0
*Pulmonary Tuberculosis	30	7	1	0	0	0	31	7
Malaria	1	0	0	0	0	0	1	0

* Notifiable only in the Metropolitan and Hunter River Districts, and, since October 2, 1916, in the Blue Mountain Shire and Katoomba Municipality.

One case of variola has been notified at Warren.

VICTORIA.

The following notifications have been received by the Department of Public Health, Victoria, during the week ending September 16, 1917:—

	Metropolitan. Cs.	Dths.	Rest of State. Cs.	Dths.	Total. Cs.	Dths.
Diphtheria	48	0	31	0	79	0
Scarlatina	29	0	11	0	40	0
Pulmonary Tuberculosis	15	9	13	1	28	10
Cerebro-spinal Meningitis	0	—	2	—	2	—
Poliomyelitis	0	—	1	—	1	—

QUEENSLAND.

The following notifications have been received by the Department of Public Health, Queensland, during the week ending September 15, 1917:—

Disease.	No. of Cases.
Diphtheria	27
Cerebro-spinal Meningitis	3
Pulmonary Tuberculosis	8
Scarlatina	2
Erysipelas	4
Enteric Fever	3
Ankylostomiasis	1

SOUTH AUSTRALIA.

The following notifications have been received by the Central Board of Health, Adelaide, for the week ending September 15, 1917:—

	Adelaide. Cs.	Dths.	Rest of State. Cs.	Dths.	Totals. Cs.	Dths.
Diphtheria	5	0	19	1	24	1
Pulmonary Tuberculosis	2	3	12	4	14	7
Pertussis	0	0	9	0	9	0
Scarlatina	0	0	5	0	5	0
Erysipelas	1	0	4	0	5	0
Morbilli	0	0	3	0	3	0
Favus	0	0	2	0	2	0
C'bro-Spinal Meningitis	1	0	0	0	1	0
Enteric Fever	0	0	1	0	1	0

TASMANIA.

The following notifications have been received by the Department of Public Health, Tasmania, for the week ending September 15, 1917:—

Disease.	Hobart. Cases.	Launceston. Cases.	Country. Cases.	Whole State. Cases.
Diphtheria	4	5	12	21
Enteric Fever	1	0	1	2
Pulmonary Tuberculosis	2	0	1	3
Bilharzia	0	0	1	1

The Medical Journal of Australia.

SATURDAY, OCTOBER 6, 1917.

Sera and Vaccines.

In the present issue we publish an illuminating address by Dr. W. J. Penfold, the Director of the new Commonwealth Serum Laboratories, on the tasks which lie before him. This institution has been established for the purpose of enabling the medical profession in Australia to have recourse to sera and vaccines prepared under skilled direction at home. The effect of transport through the hottest parts of the earth, and the consequent want of freshness will be eliminated. The supply can be controlled in accordance with the demand, and will be independent of ships and the uncertainty of travel by the treacherous sea. The immunization of the horses and other animals yielding the serum will be adjusted for those strains of organisms, or their toxins, which are responsible for the infections in the Commonwealth. The advisability of the establishment of the Commonwealth Serum Laboratories is therefore beyond dispute.

Those who read Dr. Penfold's address, will learn that the preparation of immune sera demands critical judgement, intimate knowledge of a young science, and considerable technical skill. But even the possession of these essentials will not suffice to ensure success. There is necessary, in addition, for progress and satisfactory results, that a co-operation should exist between the medical practitioners utilizing the products and the bacteriologist issuing them. On this collaboration will depend to a not inconsiderable extent the efficacy of the sera and vaccines. Variations in technique are possible when variations in therapeutic activity are desired. In the case of certain sera, such as diphtheria and tetanus antitoxin, the standardization is fixed in accordance with accepted formulæ. It is the aim of those in charge of serum institutes to produce sera of this kind of a high antitoxic valency, and this end is achieved biologically by utilizing carefully selected bacterial strains, carefully prepared toxins and carefully planned methods of injection. It is further attained by a system of concentrating the serum. In other instances, the standardization of the sera is a matter of difficulty. The therapeutic effect of these non-standardized sera should be known to the workers in the Laboratories, if uniformity is to be attained. Physicians are apt to adopt a slovenly method of appraising the value of serum treatment, when the dosage is calculated by the number of cubic centimetres of the pabulum carrying the antitoxic or antibacterial substance employed. The term "intensive serum treatment" has no meaning, unless it can be shown that an excess of antibodies is introduced into the tissues or tissue fluids of the infected person. In order to place this chapter of serum therapy on a scientific foundation, constant co-operation is essential. Finally, the same co-operation is desirable if vaccine treatment is to be assigned its scientific place in therapeutics. There are still many points in doubt connected with the action of tuberculin. There are still more points of doubt in connexion with the processes of active immunization during an infection with the several cocci, and many non-toxin producing bacilli. Much can be ascertained in the laboratory. But the final test of the therapeutic value of these biological products must be applied clinically. It thus becomes the duty of the medical profession in Australia to take an active interest in the work of the first serum producing institute that has been established in the Commonwealth.

ENUCLEATION OF THE PROSTATE.

In the year 1901 P. J. Freyer described an operation for the trans-vesical enucleation of the prostate, and recorded four successful cases. Eight years later he reported to the Sixteenth International Congress of Medicine at Buda-Pest his experience of 600 cases. He taught that in the vast majority of enlargements of the prostate in the declining years of life, the overgrowth is adenomatous. The tumours usually are embedded in the substances of the lobes, at first being mainly extra-vesical. As the adenomatous hyperplasia progresses, it extends in the direction of least resistance, and in the course of time forms a projection into the bladder. Freyer's operation depended

on the recognition of the anatomy of the true capsule of the prostate, which extends over the entire organ, save those portions known as the anterior and the posterior commissures. This capsule cannot be separated from the gland. In addition, it is enveloped by a second or outer capsule, which is formed largely by the recto-vesical fascia. The prostatic plexus of veins are contained in this capsule or sheath. He showed that the sheath of the upper part of the prostate is incomplete. When the mucous membrane is penetrated by the finger over the most prominent part of the adenomatous overgrowth, the true capsule is immediately impinged upon. It is then a matter of mechanical skill to be able to insinuate the finger between the true capsule and the outer sheath, and thus free the whole organ without injury and without damage to contiguous structures. Freyer lost ten of his first hundred patients, but subsequently his mortality was reduced to approximately 4%. It must, however, be remembered that the mortality of an operation undertaken on elderly patients, often decrepid from retention of urine and renal involvement, will be influenced on the attitude of the surgeon. Some men regard the risk as so serious in persons already enfeebled by urinary symptoms, that the operation is refused, or, if insisted on, is excluded from statistics. In any case, while Freyer's operation received the recognition of urologists it richly deserved, the experience of surgeons throughout the world was not as favourable as that of Freyer himself. Little by little an opposition school sprang up, but before this school was able to establish a case in favour of the perineal route for the removal of the prostate, the whole aspect of prostatic surgery was changed by the introduction of the principle of a properly-planned preparatory treatment prior to the enucleation. The perineal operation demands more skill and a more intimate anatomical knowledge than the suprapubic prostatectomy, and immunity from serious post-operative complications can only be assured by the exercise of great skill, by constant practice, and by a careful selection of cases. The urological surgeon, who is accustomed to perform operations on the urethra, must have studied the anatomy of the perineum, which has been very accurately worked out, especially by French anatomists, of whom Proust deserves a special mention. But even when this accuracy of work and knowledge is guaranteed, those who favour the perineal operation have not been able to show better results *quoad vitam* or *quoad complicationes* than those who advocate the transvesical route, and perhaps not such good results. The revolution, however, gave the preference to the operation of Freyer, since the majority of the symptoms which caused the operative risk to be so bad, were capable of being removed, if adequate vesical drainage and careful nursing preceded the actual removal of the gland. It has been suggested that equally good results may be obtained from catheter drainage as from a suprapubic opening of the bladder. Experience of the majority of expert urologists, however, has demonstrated that this is not so. The cystotomy is, in itself, a mild procedure, which is well tolerated. After it is performed the drainage is complete and permanent. Catheterization is not always well tolerated; and a permanent catheter is rarely applicable in these old men. In the present issue, Dr. S. Harry Harris gives an excellent account of his experience of the two-stage prostatectomy, and proves again that for the adenomatous enlargements of the prostate, this method offers the best chances to the vast majority of the patients. There is no risk of the infection of the periprostatic spaces, which is the Damocles' sword of the perineal operation, nor is the operative risk as great as after the latter operation. The indication of the two-stage operation is the necessity of the removal of the prostate, and as this means that an adenomatous condition of a non-malignant type is present, it should always be possible to find the space between the true capsule and the outer sheath at the enucleation. There are conditions of the prostate which require other forms of attack, but in the opinion of the majority of those competent to judge, the two-stage prostatectomy is the operation *par excellence* for adenomatous enlargement.

THE EPIDEMIOLOGY OF PLAGUE.

It is a common observation in the northern parts of India that epidemics of plague decline when the hot season sets in. This has usually been ascribed to the effect of heat. The explanation of how a critical temperature acts has not been satisfactory. In view of the immense importance of ascertaining the reason for the starting and ending of plague epidemics in

India, the Advisory Committee on Plague Investigations have given especial attention to this problem, and in a report signed by T. H. Gloster, F. N. White, A. N. Mukharji, J. S. Roy Chaudhuri, C. C. Mitra, G. C. Mandal and Manji Ram, the subject is dealt with on the basis of data available and collected in various parts of the United Provinces.[1] The authors found ample evidence which would justify them in associating a high degree of humidity during the winter months in certain districts with the occurrence of severe epidemics. They have further established the fact that rat fleas can survive for longer periods apart from their natural host when the atmosphere is moist than when it is dry. Many of their observations are of considerable interest, and reveal both positive and negative facts. We may find it advisable to return to these investigations at a future date. In the meantime, we content ourselves with a reference to the principal conclusions. Ralph St. John Brooks, the Secretary to the Committee, has subjected some of the data to a critical survey and offers a most ingenious and suggestive explanation of the problem.[2] It has been noted that plague epidemics are usually checked when the mean daily temperature passes above 26.6° C., and it has been suggested that at high temperatures the plague bacillus disappears from the stomach of the flea more rapidly than at lower temperatures. An analysis of the mortality-rate in different parts of India and other plague-infected countries and of the temperature records reveals that this explanation alone is insufficient. The further observation of some parallelism between the maintenance of epidemics and a high atmospheric humidity was not regarded as complete enough to be accepted without further qualification. Brooks studied the curves of the drying capacity of the air at the temperature obtaining, and compared these curves with those of the dry bulb thermometer and of the plague mortality. The term "saturation deficiency" is employed to signify the difference between the vapour tension in the atmosphere at the temperature in question and the vapour tension that would be present in a saturated atmosphere at the same temperature. Dry air at 10° C. has a saturation deficiency of 0.912 cm., while air at 37.8° C. with 80% saturation has a saturation deficiency of 0.985 cm. The author has obtained the records from Bombay, Lahore, Lucknow, Ballia, Darhanga, Poona, Nagpur, Jhansi, Belgaum, Rawalpindi, Salem, Rangoon, Java, and Mauritius, and has plotted the saturation deficiency, temperature and plague death curves. These comparative curves reveal that plague does not maintain itself in epidemic form when the temperature rises above 26.5° C., associated with a saturation deficiency of over 0.752 cm. He notes that the epidemics persist at times, when the temperature is considerably above 27° C., provided that the saturation deficiency is below 0.76 cm., and conversely an epidemic is observed to decline when the saturation deficiency is high, even when the temperature is considerably below 26° C.. Recent observations on the effect of temperature and humidity on man have revealed that the critical condition does not depend so much on the height of the wet bulb thermometer as on the dew point. In other words, the drying power of the air is known to have a profound influence on the physiological processes of the human organism. It is therefore reasonable to assume that the same conditions may exercise some influence on rats, on their susceptibility to plague infection and on their fleas. Brooks suggests that the adverse influence of high temperature and saturation deficiency may be explained by their effect on the duration of life of *Xenopsylla cheopis*, when separated from its host. These observations are of special interest to Australian hygienists. The possibility of a visitation of plague is recognized, since, as Dr. Elkington has recently pointed out,[3] "Australia is threatened from three sides by this insidious and dangerous disease." The intermediate host, the rat, is an obstinate inhabitant, and his parasite, *Xenopsylla cheopis*, finds congenial conditions in the Commonwealth. The hygrometric conditions in many parts of the eastern coast are frequently favourable for the development of severe epidemics.

[1] "Epidemiological Observations in the United Provinces of Agra and Oudh, 1911-1912," Reports on Plague Investigations in India, Issued by the Advisory Committee, *The Journal of Hygiene, Plague Supplement V.*, May 9, 1917.
[2] "The Influence of Saturation Deficiency and of Temperature on the Course of Epidemic Plague," *ibid.*

THE SPREAD OF HOOKWORM INFECTION BY TROOPS.

George B. Foster and Charles G. Sinclair have recently related some highly important findings in connexion with the troops mobilized at Nogales, in Arizona.[1] It was noted that the incidence of pneumonia, measles and other infective conditions among the members of the Alabama Infantry was alarmingly high, and that these diseases claimed a large number of victims. After much seeking for a cause of the unusual morbidity and mortality, a thorough search was made for the malarial parasite in the blood and for the eggs of the hookworm in the fæces. The former disease was not very frequent, but it was found that no less than 39.9% of 1,259 men examined were suffering from ankylostomiasis. This unexpected discovery should be heeded as a useful warning. Unfortunately it is impossible to diagnose ankylostomiasis from clinical signs or symptoms. A thorough examination of the fæces by a competent observer is the only reliable means of detecting the disease. Its presence may be inferred wherever anæmia and a high susceptibility toward bacterial infections are met with. It is unnecessary to point out the great importance of the recognition of sources of ankylostomiasis infestation, especially in rural districts and where troops are collected in large numbers in camps.

It has been announced in the daily press that Major Edmund Frank Lind has been appointed Deputy Assistant Director of Medical Services attached to the Second Anzac Corps.

MILITARY CROSS.

It has been announced that Captain J. C. G. Glassford has been awarded the Military Cross. No further details have been received up to the present.

[3] "A Review of Recent Literature and Work on the Epidemiology of Plague," *Quarantine Service Publication*, No. 5, 1915.
[1] *Journal of the American Medical Association*, August 11, 1917.

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

(116) Fibrolysin in Ocular Disease.

Robert Scott Lamb advocates the use of fibrolysin in certain eye diseases, having first tried it in six chronic cases of vernal catarrh with astonishing results (*Archives Ophthal.*, May, 1917). Fibrolysin is the trade name for a 15% sterilized solution of thiosinamine and sodium salicylate. Thiosinamine, or allyl-sulphocarbamide, is a mixture of the volatile oil of mustard and an alcoholic solution of ammonium. A lymphocytosis follows the injection, and a lowering of the blood-pressure. A child of six was struck in the right eye with a thorn bush, and the cornea was torn across with the sclera on both sides. After cyanide of mercury injection and usual treatment for ten days, he was given an injection of 1 c.cm. fibrolysin. The next day the blood in the anterior chamber was entirely absorbed. Further injections were used, and in three months the eye looked normal. A man of 45 had an immense hæmatoma in the orbit following enucleation. After two weeks of treatment 2.3 c.cm. of fibrolysin were given, and the injection was repeated at intervals with good results. A physician, aged 38, had a large vitreous hæmorrhage. Fibrolysin was injected at intervals, and in 13 months the eye was almost clean. The author employed the drug in a case of double optic neuro-retinitis before the diagnosis of syphilis was established. The ultimate good result he attributed to fibrolysin. Good results also were obtained in cases of corneal ulcer, keratitis, and exudative retinitis.

(117) Infection from Cats.

Arnold Lawson reports three cases of conjunctival infection from the fur of cats (*Brit. Journ. Ophthal.*, May, 1917). The first was that of a girl of 15, who played a great deal with a Persian cat, often burying her face in the cat's fur. She contracted acute catarrhal conjunctivitis, with yellow, purulent discharge and much chemosis. The nostrils were also greatly swollen. *Staphylococcus pyogenes aureus* was found in cultures taken from both the cat's fur and from the discharge. The second patient was a boy of 14, who suffered from conjunctivitis of the left eye and a swelling over the left parotid. It was first thought to be mumps. The conjunctivitis became worse, and the tarsi and upper fornix were covered with coarse granulations. The boy was in the habit of walking about with a Persian cat perched on his left shoulder. Under an anæsthetic the granulations were thoroughly scraped away and swabbed with a 2% solution of silver nitrate. Six weeks' further treatment were necessary. From the scrapings were isolated *streptococcus longus* and *brevis* and *staphylococcus albus*. *Streptococcus brevis* and other organisms were found in the cat's fur and skin. The third patient was a girl of five years, who, while staying in the country, contracted a muco-purulent conjunctivitis shortly after nursing a cat. This cat used to spend much of its time in the neighbouring cow sheds. The conjunctivitis was intractable, and the submaxillary and sterno-mastoid glands began to enlarge. This went on for three months. The author then saw the girl, and discerned exuberant cock's-comb granulations in the retro-tarsal tissue. He suspected conjunctival tubercle. The granulations were cut away, and the tissue treated with mitigated nitrate of silver stick. The eyes did well, but the glands broke down and required surgical treatment, with ultimate good result. The scrapings from the conjunctiva showed the presence of a few bacilli resembling the bovine type of tubercle bacillus. They were fatal when injected into a guinea-pig. The owners refused to have the cat examined, so its guilt is inferential.

(118) A New Operation for Ptosis.

Ernest E. Maddox's operation attacks the tendon of the levator from within and has, he claims, cosmetic advantages (*Brit. Journ. Ophthal.*, June, 1917). After double eversion and fixing with a special forceps, the conjunctiva is divided along the upper margin of the tarsus with a narrow Graefe knife, and reflected back from the tendon to leave it fully bared. Its fibres are then seared with the electric cautery in longitudinal furrows from the tarsus to as high up as is necessary. The centre of the tendon higher up is grasped by forceps, and one needle of a double-armed suture passed twice around the tendon. Each needle then is passed through the tarsus (the lip of which is snapped off), entering on the conjunctival surface and coming out between the parallel threads. A similar suture is inserted on each side of this, and the three tied. The knots will be away from the cornea. The conjunctiva is then sutured.

(119) The Tonometer of Schiötz.

Bernard Cridland gives the results of tonometric readings in 1,001 cases, the patients seeking advice for refractive errors (*Brit. Journ. Ophthal.*, June, 1917). The youngest patient was 7 and the oldest 88 years. The average reading was 20.06, being highest in the first decade and next highest in the sixth. The lowest result was 11.5, and the highest 30. In 1.7% only was the tension under 15, and in 3.5% over 25. The limits of normal reading are from 11.9 to 28.55, or, for practical purposes, 25. In using the instrument, holocaine should be used, and the patient look to the ceiling. The author refers to notes of 70 private cases, in which he used Schiötz's instrument. Of these, 42 were undoubted glaucoma, with readings over 25. Of the remaining 28 cases, 18 gave readings below 25, and the remainder 25 or over at one time or another. Five of these patients had arterio-sclerosis, with high blood-pressure.

(120) Retinal Signs of Arterio-Sclerosis.

P. C. Bardsley quotes Gunn's cardinal signs of sclerosis of retinal vessels (*British Journ. Ophthal.*, April, 1917). These are: (1) tortuosity of the arteries, (2) variation in the calibre of the vessels, (3) alteration in the normal light streak, (4) indentation of veins. No important signs have been added since. The prognosis in these cases was at one time considered to be very bad, but the author and other observers have seen cases where the condition improved considerably under treatment. In regard to whether sclerosed vessels can change in appearance in this manner, further investigations have shown that increased blood-pressure could produce similar appearances in the retinal vessels. The following are some points distinguishing the two conditions: (1) In high tension the vessels are uniformly, and in sclerosis they are irregularly, distended. (2) In high tension the light streak is broadened, while in sclerosis it is narrowed. (3) In high tension the vessels are full and like copper wire; in advanced sclerosis the vessels are narrow and like silver wire. Some of the appearances of high tension were induced artificially in patients by hypodermic injection of adrenalin chloride synchronizing with a rise o blood pressure.

(121) Scleral Trephining in Detachment of the Retina.

Before describing his own cases, John Green, jun., reviews the efforts of operators to create a permanent drainage between the sub-retinal and sub-conjunctival spaces by means of some form of sclerectomy (*Archives Ophthal.*, March, 1917). Schreiber made a conjunctival flap, trephined the sclera to the right or left of the inferior rectus, punctured the choroid and stitched up the flap. Tiffany clipped the protruding knuckle of choroid away. Parker incised the choroid. He found that vision was improved in four, unimproved in five, and made worse in three cases. Curtin trephined the sclera, without puncturing the choroid or retina, but ten days later aspirated 1.5 c.cm. of fluid by introducing a needle into the sub-retinal space through the scleral opening. The result was good. Other ophthalmic surgeons used the punch instead of the trephine. The author reports five cases, of which only one (a very recent case) was successful.

(122) Septal Hæmorrhage.

Xanthosia is regarded by C. C. Catt (*Journ. Amer. Med. Association*, December 2, 1916) as the most frequent cause of septal hæmorrhage. Bleeding at first slight soon becomes profuse, and may be alarming. The earliest appearance is a yellowish spot generally in the an-

terior part of the septum. The mucous membrane and perichrondrium should be raised from the cartilage, and iodoform gauze packed in, and left in position for two days. It seldom needs replacing.

LARYNGOLOGY AND OTOLOGY.

(123) Left-Handedness and Speech Defects.

That the human race is peculiarly one-sided is the view of May K. Scripture, Otto Glogau and A. H. De Bra (*Laryngoscope*, March, 1917). Corresponding to this one-sidedness we have the development of only one speech centre, which is almost invariably localized in the hemisphere which controls the right hand. The association between the centres which control the movements of speech and those of the preferred hand is very intimate. Left-handedness is not a habit, but is due to some structural peculiarity of the cerebral hemispheres. Whatever the nature of this peculiarity, it is responsible alike for the preference of one hand and for the localization of the active speech centre in one hemisphere. According to Ernst, from 1% to 5% of normal people are left-handed. Among such persons speech defects very often occur at a time when they are forced to change their natural left-handedness into artificial right-handedness. Some evidence is available to indicate that the defect disappears when a return is made to the use of the naturally right hand. The hypothesis is advocated that the task placed upon the left hemisphere in such a re-education arouses the latent speech centre there, and results in a conflict of the two speech centres, which manifests itself in speech defects, such as stuttering and lisping. The authors hold that left-handedness should be encouraged in cases where it is natural.

(124) Educational Deafness.

Educational deafness is defined as the degree of loss of hearing which prevents a child obtaining the full benefit of ordinary education in an elementary school. Such deafness, says Macleod Yearsley (*Journ. Laryn., Rhin. and Otology*, April and May, 1917) in an analysis of 1,863 cases, is either congenital (hereditary or sporadic deaf-birth) or acquired during the first two years of life. In hereditary deafness the family history shows other deaf persons in the direct line or collateral branches; in sporadic deaf-birth they appear only in the same generation. Consanguinity probably has little, and illegitimacy no causal, significance. Syphilis, however, is a most potent cause, especially where untreated and associated with other debilitating conditions, such as overcrowding, poverty, child neglect and abuse of alcohol. Kerr Love holds congenital deafness to be an evidence of expiring syphilis. The causes of acquired deafness may be: (1) infective diseases, of which measles, scarlet fever, congenital syphilis, pneumonia, and diphtheria provide over 90% of the cases, and in these deafness is generally preventible, (2) diseases of the nervous system, almost wholly meningitis, and (3) primary ear disease, middle-ear catarrh and suppuration, usually secondary to adenoids. As regards prevention, deaf mutes, when epileptic or mentally defective, should be segregated, but when deafness is the sole disability they should not be congregated together in residential institutions, with a specialized language of signs, but should be encouraged to move more freely among hearing persons, communication being effected by lip-reading and speech learnt by the oral method. Intermarriage of deaf persons, and the transmission of the recessive characters of deafness to their offspring, would thus be rendered less likely. Sporadic deaf-birth provides a problem for the social reformer, legislator, hygienist and eugenist. Syphilis should be carefully sought out and treated. In acquired deafness adequate care of the nose, throat, and ear in infectious diseases, together with skilled treatment when complications occur, is called for. General practitioners should be better instructed in otology, so that ear conditions in children should not be overlooked or wrongly diagnosed. Research into the causation and bacteriology of meningitis is required for indications as to its prevention, as deafness resulting therefrom is hopeless as regards treatment. The prevention of faulty hygiene, faulty diet and air-borne infections, conditions favourable to the occurrence of adenoids and a catarrhal state in young children, and ultimately of primary ear-disease, should be among the objects of public health activities in the pre-school age. Thorough extirpation of infecting foci in the naso-pharynx, such as adenoids and tonsils, is urged. In suppurative ear conditions a simple opening operation for drainage is preferable to more radical measures, as tending to conserve hearing. Non-suppurative conditions demand better after-treatment of adenoid vegetations, as well as better feeding, housing and sanitation.

(125) Choanal Polypus.

W. S. Syme, in discussing the method of production of choanal polypi, points out it is usually held that the pedicle of the polypus can be traced through an accessory ostium to its origin in the lining of the antrum (*Journ. Laryng. Rhinol. and Otology*, December, 1916). In the majority of cases no accessory opening exists. The polypus arises in the neighbourhood of the ordinary ostium, and finds its way through it to the middle meatus, where the configuration of the passage, the air current and gravity determine its gradual passage to the posterior nares. All antro-nasal polypi, however, are not antro-choanal. Further, he states that all choanal polypi are not antro-choanal. At times a choanal polypus takes its origin from the posterior group of one of the accessory cavities. His experience has taught him that spheno-choanal polypi are less common in the sphenoidal sinus as in disease of the maxillary antrum. He is convinced that in the majority of cases antro-choanal polypi are associated with antral disease, notwithstanding the view frequently expressed to the contrary. He demonstrates this by means of lavage. He advocates operative treatment attacking the antral cavity in every case, as the majority of these polypi recur if removed without further interference. He advocates local anæsthesia by a special method for these cases.

(126) Artificial Cerebro-Spinal Fluid.

For lavage of cerebro-spinal spaces and cavities, Dan McKenzie (*Journ. Laryng., Rhin. and Otology*, May, 1917) recommends the following solution in preference to normal saline: Pot. chlorid. 3.5; sod. chlorid. 1.5, pot. carb. 0.2; glucose 2.0; aqua dest. 100.0. This forms a stock solution, 10 parts of which is added to 90 of sterile distilled water for use. In making the stock solution the salts should be dissolved in water and the solution boiled before adding the glucose, as the latter is decomposed by boiling. A freshly-made stock solution is advised for every case, and the dilution effected in the operating theatre.

(127) Clergymen's Sore Throat.

An interesting observation recorded by G. Steele-Perkins (*Lancet.*, October 21, 1916) is that the form of pharyngitis and laryngitis to which clergymen, who speak down to their audience, are prone, is not suffered from by barristers, who speak up to the bench. Treatment by making the patient speak upwards has proved successful.

(128) A Test for Deafness.

By closely observing the eyelid with a magnifying glass a contraction of the orbicularis is invariably seen when an auditory nerve is suddenly stimulated. The ear not being tested is firmly plugged with cotton, and a bicycle-horn, two metres behind the patient, supplies the stimulus. Cases of total organic deafness do not show the phenomenon, but it is present in neuropathic deafness. F. Gault (*Presse Méd.*, September 21, 1916).

(129) Eustachian Massage.

Mink's Method of Eustachian massage has been successfully used in tubal catarrh and in acute and chronic otitis media by Alfred Lewy (*Annals Otol., Rhinol. and Laryngol.*, December, 1916). The region of the mouth of the tube is cocainized, and an Eustachian-catheter-shaped nasal applicator, but with shorter segment of curve, furnished with a terminal knob of cotton, is inserted back to the posterior pharyngeal wall, swept up into the fossa of Rosenmüller, brought forward and downward over the mouth of the tube, and immediately downward and back under the mouth of the tube. This procedure is repeated twenty times, or as often as thought advisable.

British Medical Association News.

SCIENTIFIC.

A meeting of the New South Wales Branch was held on August 31, 1917, at the B.M.A. Building, 30-34 Elizabeth Street, Sydney, Dr. R. Gordon Craig, the President, in the chair.

Dr. S. Harry Harris read a paper on prostatic obstructions and their surgical treatment (see page 285).

Dr. H. Bullock said that some of Dr. Harris's figures were astounding. When he was House Surgeon at St. Peter's Hospital, in London, Freyer claimed that he obtained a 4% mortality after his operation. The results, as he saw them, did not quite coincide with the published mortality results. None of the surgeons then used a two-stage operation. Obstructions due to an enlarged prostatic bar were not treated separately. Dr. Bullock also referred to the results obtained by Dr. Hinder ten years before at the Royal Prince Alfred Hospital. He was at a loss to find an explanation for Dr. Harris's contention that a rubber tube caused sloughing, while a glass tube did not. It was usually supposed that sloughing resulted from pressure. Rubber tubing would exert less pressure than glass tubing. In turning his attention to the mode of operating, he referred to the fact that the majority of urologists now advocated the two-stage prostatectomy. A surgeon of some eminence had recently stated that equally good results were obtainable by adopting a preliminary drainage of the bladder by catheter, instead of the suprapubic cystotomy. In regard to complications, he mentioned that when at St. Peter's Hospital he had seen epididymitis in a considerable number of cases. Dr. Harris had made no mention of the employment of spinal anæsthesia for this operation. He had employed this method in the case of a patient at the Royal Prince Alfred Hospital. The patient was much too ill for general anæsthesia. Spinal anæsthesia was well tolerated, and the patient recovered. In conclusion, he congratulated Dr. Harris on his excellent results.

Dr. Archie Aspinall thanked Dr. Harris for his valuable contribution to the surgery of the prostate. It occurred to him that the cause of sloughing when a rubber tube was employed, might be due to the tight stitching necessary to keep the tube in place. A glass drain could be kept in place without constricting the tissues. He then referred to a patient, a man aged 74 or 75 years, in whom a two-stage operation had been performed. The acute retention was relieved by a suprapubic cystotomy, and the prostatectomy was performed a fortnight later. The patient made a satisfactory recovery, but the suprapubic wound did not heal for a fortnight or three weeks. There was some trouble with a hydrocele, which eventually suppurated. After some time the patient recovered completely. He also referred to another case in which he had performed prostatectomy by the perineal route. He feared that a perineal fistula would develope. Dr. Aspinall called attention to the fact that Sir Alexander MacCormick objected to catheterization when complete retention due to prostatic enlargement was present. In reference to Dr. Harris's ingenious method of irrigation, he described the tubes employed for this purpose by Sir Alexander MacCormick. In conclusion, he asked Dr. Harris whether he had experienced any trouble in elderly patients arising from mental symptoms, and also whether he had had difficulty in arresting hæmorrhage.

Dr. John Flynn was at a loss to understand why Dr. Harris was so adverse to the perineal route. He considered it more judicious to recognize the good points in both routes, and to allow the special pathological condition in each case to decide for itself, rather than for the surgeon to cast his lot irrevocably on the suprapubic route. There were three main divisions of prostatism, namely, (*a*) chronic lobular prostatitis or glandular overgrowth, (*b*) chronic interstitial prostatitis or prostatic fibrosis, and (*c*) cancer of the prostate. The first division was by far the most frequent, and probably represented 80% of all cases. As the prostate enlarged in these cases, it often did two things which seemed to adapt it especially for suprapubic enucleation. In the first place it herniated a portion of itself through the internal vesical sphincter, and in the second place, by displacement and condensation of musculo-fibrous tissue, it produced a false capsule. When these two conditions were best fulfilled in a particular case, that case was most suited to suprapubic enucleation. Conversely, when either or both of the conditions were but imperfectly fulfilled, the case became less adapted for the suprapubic route. When both were wanting, the prostate would be better removed by the perineal route. If the suprapubic route were employed in the latter class of case, extra-capsular lymph spaces were opened up, and grave risks of pelvic cellulitis were encountered. In the case of interstitial prostatitis, and in carcinoma, the perineal route would also be preferable, as, being under the direct guidance of sight and touch, it would permit of the removal of as much or as little of the prostatic outgrowth as the circumstances of the case rendered desirable or feasible, either by knife or cautery. The operation could be abandoned without the infliction of any serious injury. This was not the case with the suprapubic operation.

The question needing solution was whether the alleged ill-effects following the perineal route were intrinsic to the operation, or whether they arose from the specialized anatomy of the region not having been mastered, as detailed by French workers in this field, and more especially from not dealing kindly with the *compressor urethrae* muscle.

In no department in surgery did pre-operative study of a case avail so much. Any operative interference in an old man with a prostatic enlargement was a procedure not devoid of danger on account of his weakened power of resistance. For this reason, anoci-association or shockless method of operating on the one hand, and the two-stage procedure on the other, were desirable. Dr. Flynn expressed the opinion that the good results of Dr. Harris were probably as much to be attributed to his pre-operative assiduity as to the operation itself.

Dr. W. F. Litchfield asked Dr. Harris if he could give him the ages of the various patients. The results had been remarkably good. He also wished to ask Dr. Harris how he differentiated between cancer of the prostate and hard forms of enlarged prostate. He had been very interested to hear that a type of malignant enlargement of the prostate existed in which there was little or no tendency to dissemination. He referred to the experience of many clinicians that spontaneous fracture in old men should always rouse suspicion of cancer of the prostate. The secondary growths were frequently localized in bone. He referred to a case of fracture of the clavicle which proved to be due to a malignant growth secondary to a prostatic cancer. The retroperitoneal glands in this case were also involved.

Dr. R. Gordon Craig congratulated Dr. Harris on his highly satisfactory results. He spoke of the importance from the diagnostic point of view of the cystoscopic appearances, especially when this method of examination was combined with urethroscopy, either by the direct or indirect method. The surgeon could then get a good impression as to how the prostate gland obstructed the flow of urine. In enlargement of the prostatic bar the obstruction was not like a single ball-valve action. It was more like two gates which moved from the sides and met in the middle line. Dr. Harris had not referred to one class of case in which malignant disease was diagnosed without justification. The speaker referred to a patient in whom a malignant prostatic tumour was diagnosed without preliminary sounding of the bladder. All the clinical signs were present, including hæmorrhage, hardness of the gland, etc. The symptoms were due to stone associated with an enlarged prostate. At times the vesical calculus produced these symptoms when the prostate was not enlarged. He confirmed Dr. Litchfield's statement that cancer of the prostate frequently recurred in bone.

Dr. Craig stated that he had seen both Young and Freyer operate. He described the operation of the prostatic punch. Young possessed an extraordinary facility of manipulation. It was a successful operation, provided that there was a careful selection of cases. He was not prepared to lay down any rules for indication of this operation. He had not used Bottini's instrument, because he regarded it as unsurgical. It was impossible to see what was being done with this instrument. Difficulty had been experienced in regard to hæmorrhage after Young's operation. In his last

paper Young had described special means of arresting this hæmorrhage with the aid of gauze and a special catheter. He (the speaker) had never met with a urethra capacious enough to accommodate this catheter. Young's operation consisted in a median and two lateral punchings. He had also seen Young perform a perineal operation. The operation was beautifully performed. On the other hand, incontinence not infrequently followed this operation. He was of opinion that the suprapubic route was the proper procedure in all cases, save in the so-called fibrous type of prostatic enlargement. For the latter he preferred either to burn the tumour by high frequency cauterization through a urethroscope, or to remove it by tenaculum and scissors through a suprapubic wound.

He laid great stress on the necessity of preliminary testing before the performance of an operation. The quantity and specific gravity of the urine and the general condition of the patient yielded more information than did the dyestuff functional tests. He relied on this procedure before determining whether to carry out a two-stage operation or a single-stage one. He considered that the two-stage operation was called for in old persons in the seventies or eighties. Formerly he had experienced difficulty with hæmorrhage, but more recently this distressing event had been singularly absent. He thought that this was due to the surgeon being able to appreciate the true plane of the tissues opened, and recognizing the surgical capsule. He had not employed a vertical incision, as Dr. Harris had done, but had obtained good results with a transverse incision, about 7.5 cm. in length. In regard to the complication of epididymitis, he stated that he had been forced to abandon the method advocated by Dr. Harris of supporting the scrotum with zinc oxide strapping, on account of the discomfort which it caused, especially in hairy patients. He preferred a handkerchief suspension, or support on a pillow. He had made several wild experiences with patients with marked mental symptoms. One of his patients insisted on getting out of bed, and could scarcely be controlled. He raised a question whether the mental symptoms had a prognostic value. He was inclined to regard them as being not a bad sign. None of his patients who had exhibited mental symptoms, had died.

In turning to the question of the post-operative treatment, Dr. Craig stated that he did not like glass drainage tubes. He regarded them as unphysiological, because they were composed of a hard, incompressible material. There was a danger of the tube slipping too far into the bladder and causing irritation. It should not be inserted more than 2 cm. into the bladder.

Dr. Craig had been very impressed by Dr. Harris's experience in regard to the return of bladder function within six days of the operation. He had not been able to achieve this under a fortnight or three weeks. He then dealt with the significance of the various published statistics, and raised the question whether some of the lower mortality rates had not been obtained with the aid of careful selection of cases. He held the opinion that some patients would not survive even a preliminary suprapubic cystotomy, and consequently if the surgeon refused to operate on these cases, the mortality rates would be considerably improved. He described in some detail Sir Alexander MacCormick's method of draining the bladder after it had been opened above the pubes. This method depended on the use of a Sprengel's pump, which maintained slight suction by means of a slow dripping of water from a reservoir suspended at a high level. He had come to the conclusion that irrigation was very seldom required in these cases.

Dr. S. Harry Harris replied briefly to some of the speakers. He stated that sloughing which followed the use of rubber tubing was obviously a chemical reaction, and was probably due to the sulphur contained. He held the opinion that if the prostate were removed in all cases by the two-stage method, the mortality could be still further reduced. He regarded the mental symptoms as probably uræmic in origin, and thought that they might be obviated in the majority of cases by adequate preparation. These symptoms had not been observed in any of his patients dealt with by the two-stage prostatectomy. When there was a uræmic condition preceding the operation, the symptoms naturally did not disappear for a short time. In reply to Dr. Flynn, he stated that it was difficult at times to determine without the aid of the cystoscope whether there was intravesical projection. The suprapubic method was equally applicable to those cases in which there was no marked intravesical projection. On the other hand, prostatectomy was not required for fibrous prostatitis. These were the so-called "bar" cases, for which the removal of the obstructing bar at the vesical neck was all that was necessary. Young's method of arresting hæmorrhage after the punching operation depended on the passage of a catheter coated with cephalin which had been dissolved in ether. Dr. Craig's experience with zinc oxide strapping was quite at variance with his own. Patients never made the slightest complaint when the strapping was properly applied. In reply to Dr. Litchfield, Dr. Harris said that his oldest patient was eighty-six years of age. He did not think that age was a bar to operation.

Dr. H. E. Clarke exhibited a specimen of an anencephalic infant. He stated that the fœtus was a seventh child. All the earlier pregnancies had been normal. There was no history of any abnormality during the seventh pregnancy. When he first saw the patient she had been in labour for six hours, but the head had not engaged the brim. He ruptured the membranes, and the head then engaged. Delivery was completed with forceps. The fœtus was a well-developed child. There was complete absence of the brain, calvarium and integument. The cranial cavity was occupied by a mass of granulation tissue.

Dr. R. Gordon Craig expressed the opinion that it was curious that the woman should have had difficulty in delivering this insignificant object.

A meeting of the Victorian Branch was held at the Medical Society Hall, East Melbourne, on September 5, 1917, Professor R. J. A. Berry, the President, in the chair.

Dr. W. J. Penfold read a paper on the establishment and work of the Commonwealth Serum Laboratories (see page 290).

Dr. K. Hiller agreed with Dr. Penfold with regard to his experience of pyorrhœa. He personally had seen no good results, except perhaps in one case. The condition should he treated by physical means, as well as by vaccines, and there should be local application. Pyorrhœa was merely pus formation between the teeth and mucous membrane, and if the cause was the tartar deposit, which could follow on the deposition from the organisms, the tartar should be removed. If this were not done, good results could not be attained. If a vaccine prepared from *micrococcus alveolaris* failed to yield a good result, a mixed strain of different organisms should be tried. Rheumatoid conditions were generally associated with a great deal of pyorrhœa. When it was impossible to isolate the streptococcus and streptococcal vaccine did no good, his experience was that the rheumatoid condition got very much better with the mixed vaccine. Vaccine treatment, however, was empirical. From a clinical standpoint remarkably good results were obtained, not in acute diseases, it is true, but in chronic diseases. One of his patients had *arthritis deformans*, with marked pyorrhœa. He objected to having his teeth attended to. He was given a mixed vaccine, and improved greatly, and yet for five or six years he had been told to have his teeth removed. It was frequently stated in regard to cases of multiple arthritis that all the teeth should be removed; this was wrong in a large proportion of cases. The removal of teeth from a mouth in a septic condition only left an opening for the organisms to enter the body's circulation, and made the patient worse than before. Unless the parts were cleaned up it was inadvisable to remove the teeth.

Dr. H. Douglas Stephens trusted that the Branch would have the opportunity later of hearing Dr. Penfold again, when his idealistic methods had been brought to practical use. He asked whether the Schick reaction was applicable to other diseases, and whether it was comparable to the von Pirquet reaction.

In reply to Dr. Hiller, Dr. Penfold stated that the local treatment of pyorrhœa by the removal of tartar, the local cleansing of the pockets with peroxide of hydrogen and other antiseptics was undoubtedly the most essential treatment. Streptococcal vaccines and emetine might be useful adjuncts, but if there were definite absorption of the bone

and the teeth were loose, the only satisfactory treatment was removal. There seemed to be no doubt that mixed vaccines in the case of arthritis did good at times.

In reply to Dr. Stephens, he stated that the Schick reaction was dependent upon the neutralization of a specific toxin by the antitoxin present in the serum of certain normal persons. As far as he was aware, this reaction had not been applied in any disease other than diphtheria, as the diseases in which it had been possible to isolate potent specific toxins were few in number. The von Pirquet test, on the other hand, was regarded as an anaphylactic test, and differed in its nature from a test which depended on the neutralization of toxin by antitoxin. The nature of the von Pirquet test would be understood when the mechanism of anaphylaxis was understood.

A meeting of the New South Wales Branch was held on September 28, 1917, at the B.M.A. Building, Elizabeth Street, Sydney, Dr. R. Gordon Craig, the President, in the chair.

Dr. R. Gordon Craig, in introducing Dr. W. J. Penfold, the Director of the Commonwealth Serum Institute, spoke of the great importance of the work which he had been called upon to undertake. He also referred to the valuable practice of inviting members from other States to address them. He regretted that the audience was not larger to listen to Dr. Penfold's address.

Dr. W. J. Penfold delivered an address on the establishment and work of the Commonwealth Serum Institute, illustrated by means of lantern slides, and also exhibited the dark ground illumination method of counting vaccines (see page 290).

Professor D. A. Welsh said that he had listened to Dr. Penfold's illuminating address with great interest. It was nearly ten years since he had advocated in strong terms the establishment of a serum institute at the Sydney University. At first the proposal had obtained support, but finally it was decided against the scheme. He was convinced that the initiation of a serum institute would be a great boon to Australia. He now realized that the failure of his original plan had one advantage; for, had there been a serum institute in Sydney, he doubted whether Dr. Penfold would have come over to speak to them. While he applauded the undertaking, he felt that there was a danger associated with the action of the Commonwealth Government. He trusted that the Commonwealth Government would not establish a monopoly, and exclude other well-known and reliable products. The Commonwealth Serum Laboratories should rely on the excellence of their products, and by fair competition with other laboratories establish its reputation. He presumed that Dr. Penfold would achieve greater success with one serum or bacterial product than with another, and it was not improbable that some practitioners might prefer to use certain imported sera. The medical profession should not be debarred from the use of the British, French or American sera. He referred to his own experience with antimeningococcic serum. He had given the local serum, prepared by Dr. R. J. Bull, of Melbourne University, in many cases, and had obtained very good clinical results. But he was convinced that the serum prepared by Messrs. Parke, Davis & Co. was better. The local serum had acted well in ordinary cases, but for the more difficult and recalcitrant cases, he had found it necessary to use the American product. This serum was followed by distinct improvement. For these reasons he maintained that the Commonwealth Government should not adopt a prohibitive protective tariff.

He had been greatly interested in Dr. Penfold's description of the technique, which he was adopting. Some of this was new to him. He instanced the newer methods of concentrating sera. He had been struck by the cogent reasons given for the choice of particular methods, after the others in use had been analysed. The medical profession would have all the more confidence in Dr. Penfold after having heard his views and having learned how he proposed to work. He was very pleased with the use of the term "technical assistant," and would probably introduce it into his own laboratories.

There was one point concerning which he differed from Dr. Penfold. This was in connexion with the standardization of antimeningococcal serum. Dr. Penfold had stated that it was impossible to apply a satisfactory method of standardization. Agglutination was no index of immunity, and he agreed that the bacteriolytic titre was of no value. On the other hand, he disagreed with the necessity of depending entirely on a laboratory standard. He referred to the work which he had carried out at the Royal Prince Alfred Hospital with Drs. Wolfe Brown and Nowland. The management had generously placed a special ward at his disposal for the purpose of experimenting with antiserum during the epidemic of cerebro-spinal meningitis. Later, when this ward had been closed, the honorary staff had very kindly assisted him in continuing his observations in their own wards. He therefore did not think that Dr. Penfold need despair of obtaining an experimental hospital in connexion with his institute.

Professor Welsh trusted that Dr. Penfold was not referring to an Australian author, when he spoke of the confusion of the terms serum and vaccines. No student would be accorded a long sitting at an examination if he made this unpardonable error. He then turned to the question of the scientific evidence of the value of certain sera and vaccines. He was surprised that a man of such high scientific attainments as Dr. Penfold should still be so sceptical concerning the value of vaccines. He was not at all prepared to accept the method of testing the value of a treatment by its application in alternate cases. He admitted that it was difficult to suggest a better method of proving the value of a serum or vaccine, but it had, in his opinion, many serious disadvantages. He thought that selection by hazard was less acceptable than intelligent selection of cases. He considered that the mere fact that vaccines were of considerable prophylactic value was presumptive evidence of their value in treatment. He had spoken to Dr. Penfold about this, and had received the reply that in an infected individual the bacteria had already had an opportunity of producing antibodies. He referred to Wright's views on this matter. Wright held that during the course of an infection the affected tissues became exhausted. Vaccination, on the other hand, took advantage of the unexhausted tissues. He held that the experience of men who had treated disease and watched its progress must be accepted as some proof of the value of sera and vaccines. He personally had had a limited experience of vaccines, extended over many years. The impression left on his mind was that vaccines were of value in treatment, and of great value in some cases. He related the course of a case of advanced tuberculosis, with extensive involvement of the epiglottis. The microscopical examination had revealed many giant-cell systems. Notwithstanding the undoubted bad prognosis in this case, the laryngeal lesions had cleared up completely under tuberculin treatment. He felt that when they learned how to handle vaccines efficiently in all cases, the results would be distinctly better. He looked to Dr. Penfold to teach them how to use these products properly, and then they would be able to cure every case of bacterial infection.

Dr. A. E. Mills only had words of commendation for Dr. Penfold's highly instructive paper. He was particularly pleased to note a tone of healthy scepticism running throughout the speech. He found that there was one distinct blot in the scheme, for which, however, he recognized Dr. Penfold was in no way responsible. It was that research was not provided for. He considered that research was an essential factor in a serum institute. He hoped that this was not a final word on the subject. It was a great comfort for them to learn of the care which would be taken in the standardization of those sera which were capable of standardization, and also of the precautions to be taken against accidental contamination. Dr. Mills said that it was no secret that Professor Welsh and he did not agree concerning the value of serum in epidemic cerebro-spinal meningitis. He had spoken on this subject so often that he would not repeat himself on this occasion. He wished, however, to protest that the "impressions left on the mind" that Professor Welsh valued sera in this disease and vaccines in other pathological conditions, were valueless as scientific evidence. Professor Welsh did not like the alternate case suggestion. But he could not suggest a better one. The determination of the value of a form of treat-

ment should be free from all bias. In conclusion, he thanked Dr. Penfold for his interesting communication.

Dr. J. Burton Cleland referred to the fact that Dr. Penfold was in the Commonwealth service, and therefore they should not welcome him as a visitor, but rather claim him as one of themselves. He stated that the success of the institute of which Dr. Penfold was director, would depend to some extent on medical men using the products which he would issue. The preparation of sera and vaccines was very expensive, and there might be some difficulty in making this undertaking pay. He suggested that if the products were used by all medical practitioners in the Commonwealth, and if they could be introduced into the islands in the Pacific, and even as far as the Philippines, it might be made nearly to pay. He felt sure, after listening to Dr. Penfold, that the products of his institute would be reliable and prepared with great care. The most modern methods were to be employed, and it was therefore the duty of all doctors to use his sera. He agreed with Professor Welsh that there should be no monopoly, but he was of opinion that Dr. Penfold's institute would bring credit to Australia. In regard to the question of research, he pointed out that it was quite evident that the attention that would be given to improvements in technique must necessitate constant research of importance. He was interested to learn that it was proposed to make antidysenteric serum. He pointed out that dysentery was not epidemic in Australia at present; it was scarcely endemic. A few sporadic cases occurred. There was, it was true, some danger of an introduction of this disease through the medium of returned soldiers. Dysentery had been rife in the early days, but it had died out in the 'fifties, to be replaced by enteric fever. In regard to antimeningococcal serum, he was highly interested in what Dr. Penfold had said. He would not commit himself further than saying that there might be some evidence that it played some part. He asked Dr. Penfold whether he considered the evidence so weak that it would be justifiable to apply the test of treating alternate patients without serum. He suggested that some indirect evidence might be obtained by watching the effect of a gonococcus vaccine applied locally to the urethra.

Dr. W. F. Litchfield was delighted with Dr. Penfold's address. He held that it was a most important enterprise. It should encourage methods of accurate thinking, besides supplying them with reliable and fresh vaccines and sera. He agreed that there was no rigid proof of the value of vaccines in treatment, and also referred to the statement that Dr. Penfold did not propose to prepare more than one form of tuberculin. This revealed a healthy kind of conservatism. He was convinced that the Commonwealth had found an excellent director for their institute in Dr. Penfold. He had but little doubt that research would be added to the programme at a later date, and that opportunities would be offered for post-graduate research. This was inevitable and essential. He asked whether Dr. Penfold proposed to manufacture Jennerian vaccine. He recounted the experience they had had with the Australian vaccine during the recent scare. The vaccine issued was too strong at first, and the patients suffered severely from cellulitis. Later it was diluted, and was then too weak, and would not take at all. He hoped that they would be able to rely on a good, reliable vaccine for small-pox. Concerning the antitoxic sera, he stated that at the Children's Hospital upwards of £600 had been spent on these products last year. They had obtained their sera from Burroughs Wellcome & Co., Parke Davis & Co., and the Lister Institute. They were all equally good. Abscess formation had been practically unknown, and no harm had ensued after intravenous injection. Serum sickness did occur, especially in adults, but he had never seen a fatal case. He endorsed what Dr. Penfold had said regarding vaccines, that the results were not encouraging. In conclusion, he asked whether it was proposed to supply material for carrying out Schick's test.

Dr. Burton Bradley thanked Dr. Penfold for his interesting paper. He had been specially attracted by it, because when he first came into contact with Dr. Penfold, he was working along the same lines as he was then following. On hearing that he was to direct the Commonwealth Serum Laboratories, he had at first thought that it was a pity for a man of his ability to devote himself to what was practically a commercial life. He now recognized that Dr. Penfold was going to keep the scientific aspect in sight the whole time. He asked whether he proposed to produce sera other than those used in prophylaxis and treatment. He referred especially to hæmolytic sera for the complement deviation test in syphilis. At the Government Microbiological Laboratory they had experienced much difficulty. The serum obtained from immunized Australian rabbits was very unsatisfactory. The rabbit did not respond well. On the other hand, the hæmolytic serum imported often behaved erratically. If Dr. Penfold could see his way to import English rabbits and to prepare hæmolytic serum for use in the complement deviation test, this would be of great value. Dr. Bradley then referred to his experience of filtration through Pasteur-Chamberland candles. Both Dr. Cleland and he had found this method quite reliable, and he was pleased to learn that Dr. Penfold had determined to adopt it. Concerning the effect of heat on bacteria destined for use as vaccines, he stated that they had not found that the protective power was influenced by employing heat up to 56° C. when preparing the anti-typhoid vaccine for the inoculation of Australian troops. They had found that the bacteria were at times not killed when the temperature was kept at from 60° to 62° C. for a half of an hour, if there was any albuminous substance present. In discussing the question of the liability of serum sickness developing, he asked Dr. Penfold whether the suggestion to use two species of animal for the production of antitoxin, was a practicable method of overcoming the risk. If a person had previously had an injection of horse serum, and it was necessary to give antitoxin, that derived from another animal might be used.

Dr. Penfold replied to several of the questions raised. He felt sympathy with Professor Welsh and Dr. Cleland in connexion with a restricted tariff in imported products. The Commonwealth Serum Laboratories would have to stand or fall on the merits of its products. He thought, however, that the importation of sera should be limited to a certain extent. The products of institutes in which reasonable precautions against contamination and careful standardization were not carried out, should be prohibited. This restriction obtained in the United States of America, and was a wise safeguard. Professor Welsh had objected to the alternative scheme of testing the value of antimeningococcic serum. He stated boldly that if he had the disease, he would be quite content to be one of the patients who did not get any serum. He pointed out that in a recent issue of *The Medical Journal of Australia*, one observer had related that the patients who had been treated with lumbar puncture alone, had done quite as well as those who had had serum; indeed, it appeared that they had done better. It was quite essential to keep an open mind, and to judge dispassionately of the value of the serum until absolute proof was forthcoming. He refused to be influenced by impressions. He was prepared to admit that laboratory standards were perhaps not essential, provided that clinical standards were available and gave unmistakable indications. What he insisted on was that there should be convincing proofs of the value of sera or vaccines, before their place was finally assigned to them.

He was pleased that Professor Welsh approved of the adoption of the term "technical assistant." It was an American term. He held that a well-trained, thoughtful individual, who had not had a medical training, and therefore did not possess the same commercial value as the medical graduate, was in place in the laboratory. A first-class technical assistant would have as good brains as a medical man. He was strongly of opinion that there should be a close association between the members of the scientific staff, and that a real collaboration in work would produce a useful body of workers. In returning to the means of determining the value of biological substances in treatment, he pointed out that Wright had held that, in the course of a chronic disease like tuberculosis, it was justifiable to judge the effect of any new form of treatment, applied after the process had lasted unchecked for a considerable time. He would not admit that the test was a good one, but such a test was certainly futile in an acute infection. He objected to the proposal of an intelligent selection, because it was almost impossible to exclude per-

sonal bias. It was far better to eliminate bias altogether, and, by continuing the test through a long series of cases, to obtain a reply which was free from all objection. He did not accept Professor Welsh's reasoning that, because vaccines had proved themselves of use prophylactically, they were therefore of value in treatment. He conceived it quite possible that the immunization was complete before the vaccine was given. The experience of Roland with plague showed that the maximum immunization was attained after two or three days. It was possible that vaccines were of therapeutic value; but it had not yet been demonstrated. Wright had admitted after years of patient work with tuberculin that he did not know what was the best dose to give.

In reply to Dr. Cleland, he stated that he did not think that sufficient investigation had been carried out in Australia to exclude the presence of dysentery. It was not improbable that the anti-Shiga serum might be required for export to countries not far from Australia. He proposed to make Jennerian vaccine. He explained the action of glycerine in clearing the vaccine of extraneous organisms, and offered an explanation for the experiences related by Dr. Litchfield. He hoped that it would be possible to issue Nuguchi's vaccine. The material for Schick's test was $^1/_{50}$ of the minimum lethal dose for a test guinea pig of diphtheria toxin. He proposed to issue this, but warned his audience that toxin was apt to vary, and was therefore difficult to commercialize. He also proposed to import rabbits from England, and would issue hæmolytic sera. The proposal to immunize two or three different species of animals was expensive, and, he thought, for the present conditions of Australia impracticable. Moreover, he had found that serum sickness could be diminished by getting rid of much of the proteins. Relatively few cases of anaphylaxis had been observed. He thanked the President and members for their kind welcome.

Dr. G. H. Abbott and Dr. F. P. Sandes have been elected members of the Federal Committee representing the New South Wales Branch of the British Medical Association.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xvii.

Australian Institute of Tropical Medicine, Townsville, Queensland, Assistant.

The University of Melbourne, Department of Anatomy, Stewart Lecturer in Anatomy, Stewart Scholar in Anatomy, Lecturer in Histology and Embryology.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
TASMANIA. (Hon. Sec., Beltive, Tasmania.)	Medical Officers in all State-aided Hospitals in Tasmania.
VICTORIA. (Hon. Sec., Medical Society Hall, East Melbourne.)	Brunswick Medical Institute. Bendigo Medical Institute. Prahran United F.S. Dispensary. Australian Prudential Association Proprietary, Limited. National Provident Association. Life Insurance Company of Australia, Limited. Mutual National Provident Club.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Medical Officers to the Selwyn Hospital, North Queensland. Brisbane United Friendly Society Institute. Warwick Hospital.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.)	The F.S. Medical Assoc., Incorp., Adelaide.
WESTERN AUSTRALIA. (Hon. Sec., Health Department, Perth.)	All Contract Practice Appointments in Western Australia.
NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Balmain United F.S. Dispensary. Canterbury United F.S. Dispensary. Leichhardt and Petersham Dispensary. M.U. Oddfellows' Med. Inst., Elizabeth Street, Sydney. Marrickville United F.S. Dispensary. N.S.W. Ambulance Association and Transport Brigade. North Sydney United F.S. People's Prudential Benefit Society. Phœnix Mutual Provident Society. F.S. Lodges at Casino. F.S. Lodges at Lithgow. F.S. Lodges at Parramatta, Penrith, Auburn and Lidcombe. Newcastle Collieries — Killingworth, Seaham Nos. 1 and 2, West Wallsend.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, N.Z.

Diary for the Month.

Oct. 5-6.—N.S.W. Branch, B.M.A., Annual Meeting of Delegates of Local Associations with the Council.
Oct. 9.—Tas. Branch, B.M.A., Council and Branch.
Oct. 9.—N.S.W. Branch, B.M.A., Ethics Committee.
Oct. 11.—Vict. Branch, B.M.A., Council.
Oct. 12.—S. Aust. Branch, B.M.A., Council.
Oct. 12.—N.S.W. Branch, B.M.A., Clinical.
Oct. 16.—N.S.W. Branch, B.M.A., Executive and Finance Committee.
Oct. 17.—W. Aust. Branch, B.M.A., Branch.
Oct. 19.—Q. Branch, B.M.A., Council.
Oct. 20.—Northern Suburbs Med. Assoc. (N.S.W.).
Oct. 20.—Eastern Suburbs Med. Assoc. (N.S.W.).
Oct. 25.—S. Aust. Branch, B.M.A., Branch.
Oct. 26.—N S.W. Branch, B.M.A., Branch.
Oct. 30.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.
Oct. 31.—Vict. Branch, B.M.A., Council.
Nov. 2.—Q. Branch, B.M.A., Branch.
Nov. 3.—Vict. Branch, B.M.A., Nomination Papers for Election of Members of Council Issued.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this Journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

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